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DISEASES CAUSED BY BACTERIA AND FUNGI.

I. STONE, D. M., & MORRISON, A. G. (1935). **Non-Caseous Lymphadenitis in Imported Lamb or Mutton.**—*Med. Offr.* **53.** 115-116. 4 figs. on 1 plate. [4 refs.]

II. —. (1935). **Caseous Lymphadenitis.**—*Ibid.* 113.

I. The authors found cases of non-caseous lymphadenitis, in imported lamb and mutton, which differed in microscopical appearances from the more common form of caseous lymphadenitis. Representative material was collected from 14 carcasses and submitted to histological and bacteriological investigation. The glands referred to were the prescapular and inguinal and they were enlarged to the size of a cherry. The capsules of the affected glands were found thickened and there was much fibrosis, which affected principally the vascular system in the form of marked peri-arterial fibrosis, spreading from the vessels to the surrounding tissues, and accompanied by a patchy thickening of the fibrous trabeculae throughout the substance. The fibrous tissue was not specifically related to degenerate foci. There were no typical giant cells and there was no eosinophilia. Sections from some of the glands showed that the sinuses were packed with Gram-positive cocci, mainly diplococci, in chains. The organism grew slowly on agar but readily on nasgar, and was aerobic and facultatively anaerobic. The test for haemolysis was negative and the organism was not bile-soluble. The streptococcus was not pathogenic for guinea pigs.

II. The investigation points to the necessity for public health meat inspectors to distinguish between caseous lymphadenitis caused by the Preisz-Nocard bacillus and the non-caseous lymphadenitis caused by the streptococci.—BRENNAN DEVINE.

MENKIN, V. (1934). **Further Studies on Mechanism of Invasiveness by Pyogenic Bacteria.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 162-164. [4 refs.]

MENKIN, V., & WALSTON, H. D. (1935). **Role of Coagulating Principle of Staphylococcus Aureus in Relation to Invasiveness of this Microorganism.** —*Ibid.* 1259-1263. 1 table. [8 refs.]

[Menkin has previously shown that *S. aureus* is primarily a non-invading organism because the intense local reaction which it sets up causes it to be rapidly " walled-off " by the formation of a barrier consisting of a fibrinous network and

thrombosed lymphatics. In the case of the pneumococcus Type I and *Streptococcus haemolyticus*, barrier formation was delayed owing to mild local action and so the organisms were free to invade the regional lymphatic vessels and the system —see this *Bull.* **4.** 441].

In the first paper Menkin now shows that the localizing property of *S. aureus* is chiefly due to its ability to secrete an exotoxin-like product resembling leucocidin which is capable in itself of inducing sufficient local damage to obstruct the lymphatics. No such substance was demonstrable in the case of pneumococcus Type I and *Str. haemolyticus.*

In the second paper Menkin and Walston show that the barrier-forming property of the staphylococcus has apparently no connexion with the *in vitro* coagulating principle present in staphylococcus filtrates.—GWILYM O. DAVIES.

PATARINO, V. G. (1935). Sulla pretesa sporificazione del bacillo del carbonchio ematico nell'intestino degli animali. [**Non-Sporulation of *Bacillus anthracis* in the Intestines of Animals**].—*Profilassi.* **8.** 137-140. [7 refs.] [English and French summaries : abst. from orig.]

In order to determine whether *B. anthracis* is able to sporulate in the gastro-intestinal tract, rabbits and guinea pigs were given bran mixed with various organs obtained from guinea pigs which had died from anthrax. The faeces from the experimental animals were collected between the sixth and the 40th hours after feeding and treated with dilute hydrochloric acid. Broth cultures were then inoculated with the faecal emulsions and incubated for 48 hours at 37°C. In every case the broth cultures remained sterile, which indicated that *B. anthracis* had not sporulated in the gastro-intestinal tracts of the experimental animals.—J. A. N.

CAMERON, A. E. (1934). **Anthrax.**—*Pamphl. Dep. Agric. Can.* No. 160. pp. 11. 1 table.

The pamphlet gives a general account of the disease.

A table is furnished showing the number of outbreaks which have occurred in the different provinces of Canada from 1903 to 1929 : since 1920 there have been only isolated cases.

The occurrence of the disease, its method of infection, diagnosis, disposition of carcasses, use of vaccines, etc., are discussed, and reference is made to anthrax in man. Finally a list of the regulations relating to the disease in the Dominion is appended, and attention is also directed specially to certain sections of the Canadian Animals Contagious Diseases Act.—J. M. L. PENHALE.

FRÖHLICH, W. (1935). Zur Frage der Hautspezifität der Milzbrandinfektion. [**Skin Specificity in Anthrax Infection**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 449-454. [35 refs.]

The author has attempted to confirm or disprove the theory, originally advanced by BESREDKA, that susceptibility of an animal to anthrax is dependent upon the susceptibility of the skin cells to this infection. He inoculated rabbits by the intravenous, subcutaneous, intrapulmonary, intraperitoneal and intracerebral routes, in every case taking elaborate precautions to avoid contamination of the skin with bacilli or spores. He was able to infect rabbits by all these routes given suitable conditions. Thus the implantation of capsules containing the organism in the intraperitoneal cavity did not produce anthrax if these capsules were broken almost immediately, as the presence of the capsule in the cavity produced a powerful leucocytosis and the bacilli were all destroyed. If the capsule was broken some days after introduction anthrax resulted. The foregoing findings indicate that

the infectivity of anthrax depends upon the susceptibility of other tissues besides the skin.—E. J. PULLINGER.

BRAZIL, V., & BRAGA, A. (1935). Da importancia do lipoides no preparo da vaccina contra o carbunculo hematico. [**The Importance of Lipoids in the Preparation of Anthrax Vaccine**].—*Bol. Inst. Vital Brazil.* No. 17. pp. 3-21. 5 figs. [1 ref.] [French and German summaries : abst. from orig.]

Following the success attending the fixation of toxins with animal lipoids, the authors investigated the effect of lipoids upon cultures of *Bacillus anthracis* and discovered that, whereas the lipoids had no effect upon the growth of the organisms in culture, a distinct and permanent attenuation was produced. While 0·5 c.c. of the initial culture was fatal to a guinea pig within 48 hours, 2 c.c. of the 24th generation in broth with 1 to 2 per cent. lipoid was not invariably lethal. Experimental vaccination of laboratory animals, sheep, cattle and horses gave conclusive results with large test inoculations of virulent culture.

Over 75,000 animals have been vaccinated since 1932 and up to the present no cases of anthrax have been reported amongst them.—R. S. ROBERTS.

TYABJI, A. (1935). Die Biochemie der säurefesten Bakterien. [**Biochemistry of the Acid-Fast Bacteria**].—*Zlb. Bakt. I. (Ref.).* **118.** 241-259. 15 tables. [Numerous refs.]

Tyabji reviews the literature of the chemistry of the acid-fast bacteria under the following headings :– cultivation and methods of examination including their general make-up, the polysaccharides, acetone-insoluble phosphatides, acetone-soluble fats, chloroform-soluble wax, the free saturated acids of the human tubercle bacillus, the chemistry of the proteins of acid-fast bacteria including tuberculin, the biological activity of their cleavage products, some details of the conditions under which they can live, and finally a general summary of the more striking points.

The polysaccharide is built up of various sugars and contains the rarely occurring arabinose. The phosphatides are of a new class ; instead of the relation P : N being 1 : 1 as in the true phosphatides, it is from 1·8 : 1 in BCG to 5·8 : 1 in *Mycobact. phlei.* Lecithins are definitely not present because the choline base has not been recognized in the phosphatides, and the nitrogen – at least in the human type – occurs as ammonia directly bound to phosphorus. Besides the glycerin-phosphoric acid compounds, polyalcohols occur in the form of carbohydrates. By acid hydrolysis these give rise chiefly to mannose, inosite and acid-reacting sugars (glycuronic acids, hexuronic acids ?).

The fat is peculiar in that it does not contain glycerin, as do all fats of plant or animal origin, but sugar which, in the case of the human type, is 43 per cent. trehalose.

The wax has a peculiar composition and is sufficiently designated as a complex phosphatide with a high carbohydrate content. The " acid-fastness " of the human type is attributable to a dioxy-carboxylic acid of high molecular weight, $C_{94}H_{188}O_4$. Other acids of high molecular weight do not occur. An interesting fact is that the substance of high molecular weight mentioned (the " unsaponifiable " of ANDERSON) possesses the so-called acid-fastness in high degree, but only in the unesterified state. Because, however, those acids occur in the bacteria in combination with sugar, the problem of acid-fastness is not thus solved. The " mycol " of TAMURA could not be found by ANDERSON ; he did not, however, break up the bacteria to the same degree as TAMURA.

The acids in the wax are combined with sugar and not with univalent alcohols.

The carbohydrate gives by hydrolysis 50 per cent. d-arabinose and d-galactose. The " purified " wax obtained from the human type contains also organic phosphoric acid and a nitrogen compound which gives glucosamine as a cleavage product.

The biologically important derivatives of the bacteria are, apart from tuberculin, associated with certain lipoid fractions. The tuberculo-phosphatide displays antigenic activity and by intraperitoneal injection in guinea pigs gives rise to true tuberculous tissue accompanied by epithelioid cells, giant cells, tubercles and caseation. This property is associated further with certain saturated fatty acids which easily form ether-soluble lead soaps. The most active is the dextro-rotatory phthioic acid $C_{26}H_{52}O_2$ of the human type. The laevo-rotatory C_{30} acid is biologically inactive as is also the 19 carbon atom containing tuberculo-stearic acid. The phosphatides of the leprosy bacillus and *M. phlei* are, though to diverse degrees, biologically active, although they show no optically active acids. The tuberculo-stearic and like acids of the bovine type are also biologically active. Those from the avian type are, in contrast, inactive.

The most recent research in tuberculin has shown that tuberculin products of high value may contain little or no protein. On the other hand, the value of the tuberculin protein of Seibert is not underestimated. The results obtained with tuberculin protein, the "C-fraction" of JADASSOHN and the β tuberculin of KALLOS have proved in an unequivocal manner that the action of tuberculin is a true allergic-anaphylactic reaction.—A. W. STABLEFORTH.

BERGMAN, D. (1934). Några synspunkter vid klinisk diagnos av de öppna tuberkulosformerna hos nötkreatur. **[Clinical Diagnosis of Open Tuberculosis in Cattle]**.—*4 Nord. Vet.-mötet. Helsingfors. 1933.* pp. 93-116. 3 figs., 1 table. [English summary : abst from orig.].

A paper in which claims are made concerning the diagnosis of tuberculosis in cattle and the manner in which the disease spreads ; these are severely criticized by SVENDSEN and MAGNUSSON in the course of the discussion which follows.

—GUSTAV NAERLAND (FARSUND).

OVERBEEK, A. A. (1935). Bestrijding der rundertuberculose in Nederland. **[Control of Bovine Tuberculosis in Holland]**.—*Tijdschr. Diergeneesk.* **62.** 623-632. [English, French and German summaries : abst. from orig.]

A historical account of schemes for the control of bovine tuberculosis in Holland. In 1926 the civil veterinary department instituted a voluntary control scheme based on the use of the tuberculin test, reactors to be ear-marked. In 1933, 4,800 farms out of 9,700 dealt with were free from tuberculosis. Before 1926, however, the large stock-owners in Friesland had organized a plan to control the disease [see this *Bull.* **5.** 101]. In 1933, 2,000 out of 4,500 farms in Friesland were free from tuberculosis.—J. E.

RAUTMANN, H. (1935). Wie erfolgt die Tuberkulose-Infektion des Kalbes und welche Massnahmen sind zur Verhütung der Ansteckung erforderlich ? **[Measures Necessary for the Prevention of Tuberculosis in Calves]**.—*Tierärztl. Rdsch.* **41.** 529-534 and 547-550. 1 fig., 2 tables. [14 refs.]

Rautmann has for some time opposed the view that ingestion is the most important source of tuberculosis in calves, a view which is very generally held in Germany and elsewhere. He now concludes from experiments on four calves that, whilst the feeding of a single large dose of infected milk is sufficient to cause progressive infection, it always produces lesions in the intestine and

associated glands and secondary lesions elsewhere and that, therefore, the absence of tuberculosis of the intestine or of the intestinal glands is evidence that the path of infection was not ingestion. Tuberculosis of the mesenteric glands is, moreover, secondary in the majority of natural cases. Tuberculosis of the liver in young calves, which is often associated with pulmonary tuberculosis, is evidence of uterine infection.

He quotes statistics referring to 44 million calves slaughtered in the period 1913 to 1932, showing that 59 per cent. were reported as being affected with pulmonary tuberculosis, 30 per cent. with tuberculosis of the liver and only 11 per cent. with intestinal tuberculosis, and concludes that infection by ingestion falls far behind other sources. His own detailed *post-mortem* examinations [see this *Bull.* **5.** 780.] lead him to the same conclusion. He emphasizes strongly the need for the complete separation of the calves from older cattle and for better buildings for calves, in addition to the adequate testing of all milk and creamery residues returned to the farm, and tuberculin tests to detect congenital infections.—A. W. S.

CHRISTENSON, I. (1935). En metod för effektiv respirationshämning vid undersökning å lungtuberkulos hos nötkreatur. **[Effective Method of Hindering Respiration when Examining Cattle for Tuberculosis].**—*Svensk VetTidskr.* **40.** 13-21. 5 figs.

The author describes his rubber nose cap for occluding the nostrils of cattle in order to make them cough so that râles may be more apparent when present on auscultation for the diagnosis of pulmonary tuberculosis. [The method is used to a large extent in Germany, Sweden and elsewhere].

The cap is bucket-shaped and provided with rubber cords to enable it to be quickly and firmly fixed on the head. The *modus operandi* is described and illustrated.—J. E.

WERDELIN, K. (1934). Et tilfaelde af tuberkulose hos hesten. **[Tuberculosis in a Horse (from a Report of Army Horses)].**—*Maanedsskr. Dyrlaeg.* **46.** 347-351. [7 refs.]

A six-year-old horse had been under observation for more than a year owing to bad condition, emaciation and a tendency to sweat after working for a short time. At the end of the year a tuberculin test gave a positive reaction and this diagnosis was confirmed when the animal was slaughtered. From 1910 to 1933, 0·22 per cent. of Danish army horses have shown evidence of tuberculosis when examined *post mortem*.—H. C. BENDIXEN (COPENHAGEN).

TOPACIO, T. (1935). **Susceptibility of Native Carabaos [Buffaloes] to Experimental Tuberculosis. (Preliminary Report).**—*Philipp. J. anim. Indust.* **2.** 181-191. 1 text fig., 9 figs. on 4 plates. [7 refs.]

Clinical tuberculosis has not yet been recorded in water-buffaloes of the Philippine Islands, but two years ago two bovine strains of *Mycobact. tuberculosis* were isolated from native cattle. One of these proved very difficult to adapt to artificial culture media. This was effected by repeated passage through rabbits for two years, then through a water-buffalo which died from tuberculosis as the result of the inoculation, and finally back to another rabbit, the first primary culture of the strain (B-22) being obtained from this rabbit. Morphologically the organisms from the culture resembled typical bovine bacilli. Culturally Dorset's egg and glycerin-agar media were found unsuitable, the best of those tried being that of SWEANEY and EVANOFF. Repeated sub-cultivation at bi-monthly intervals

was made before an abundant growth was obtained. The very minute growths on the primary culture probably accounted for the delay in establishing the strain.

Details of pathogenicity tests upon rabbits, guinea pigs, goats, monkeys and cattle are given, and finally the author's experiments by inoculation of two adult and one calf buffalo, and by contact of one buffalo with two inoculated cattle and one inoculated buffalo. All except the calf showed typical lesions of tuberculosis after dying under the test or when killed. Nothing is said about the second culture mentioned.—C. V. WATKINS.

GUÉRIN, C. (1935). Les preuves scientifiques de l'efficacité de la vaccination contre la tuberculose par le BCG. **[Efficacy of BCG Vaccination].**—*Bull. Acad. Méd. Paris.* **113.** 375-378.

In this contribution Guérin briefly describes the principles under which the vaccine produces a resistance to tuberculosis. He supports his views by giving the names of workers who have confirmed his findings, together with the nature of their experiments. He states that the vaccine produces in the vaccinated animal a state of allergy, the duration of which varies in the individual subject. While in that state the animal will always react to a tuberculin test.

Guérin believes that the results obtained in bovines are also possible in human beings.—G. DODS MUNRO.

FELDMAN, W. H. (1935). **The Lesions in Rabbits following Inoculation with Bacillus Calmette-Guérin (BCG).**—*Amer. Rev. Tuberc.* **31.** 323-332. 5 figs., 2 tables. [7 refs.]

A strain of BCG was inoculated into two flasks containing glycerin-beef, broth-peptone medium ; one of these flasks was enriched with 10 per cent. fresh horse serum. 0·5 c.c. of a uniform suspension of the bacteria from each of these two flasks was inoculated intravenously into three rabbits and subcutaneously into two guinea pigs. One rabbit died ten days after inoculation ; the others were destroyed 174 days after inoculation. Extensive tubercle-like lesions were found in the lungs (but not in the other organs) of all the five killed rabbits. No tuberculous lesions developed in the four guinea pigs. In the rabbit which died, lesions were found composed of epithelioid cells, lymphocytes and occasional giant cells ; there were large numbers of acid-fast bacillary forms in the centre. Necrosis with caseation characterized the lesions in the killed rabbits ; acid-fast bacilli were present in these lesions also, but not in masses such as were found in the rabbit that died. Although bacteria could be demonstrated in the lung nodules, no growth was obtained on culture, and inoculation of rabbits and guinea pigs with emulsions of the lung lesions yielded negative results.

The above result was not confirmed in another similar experiment.—A. B.

SOUTHWOOD, A. R. (1935). **Tuberculosis Today and Australia's Opportunity.**—*Med. J. Aust.* Feb. 23rd. 239-241.

The situation regarding the eradication of human tuberculosis is more favourable in Australia than in most countries and a scheme whereby eradication might be accomplished is outlined. Reference is made to the eradication of bovine tuberculosis from dairy herds and to the report of the special committee on cattle diseases appointed by the Economic Advisory Council in England.—W. I. B. B.

MÜNDEL, O., & STREMPEL, W. (1935). Der bovine und der humane Typus der Tuberkelbacillen bei menschlicher Tuberkulose. I. Vorbemerkungen.

[The Bovine and Human Types of Tubercle Bacilli in Human Infection. I. Introduction].—*Z. Hyg. InfektKr.* **117.** 139-148. 7 tables. [14 refs.]

Two hundred strains of tubercle bacilli isolated from cases of tuberculosis in human beings were examined. Of these 8·5 per cent. were of bovine type. Only eight of these strains were isolated from children under 16 years of age and, of the eight, three were of bovine type. Out of the 17 bovine strains which were encountered, six were isolated from cases of bone or joint infection, three from cervical or axillary glands, three from the urogenital tract, two from the abdominal organs, one each from the lungs and meninges and one from a case of generalized tuberculosis.—E. J. PULLINGER.

GRIFFITH, A. S., & MUNRO, W. T. (1935). **Family Tuberculosis due to Bovine Tubercle Bacilli.**—*Brit. med. J.* July 27th. 147-150. [1 ref.]

After referring to the previous lack of evidence of the transmission between human beings of pulmonary tuberculosis caused by the bovine type of bacillus, the authors give the histories of two families in each of which occurred two such cases in adults, and in one, in addition, a case of glandular tuberculosis in a child. They state that the bacteriological evidence (cultural tests) established that all five cases were infected with tubercle bacilli of the bovine type. The ways by which infection was contracted could not be determined with certainty.—E. BROWN.

WEBSTER, R. (1935). **Human Tuberculosis of Bovine Origin in Victoria.**—*Med. J. Aust.* March 16th. 323-326. [8 refs.]

Previously published data showed that 20 to 25 per cent. of tuberculosis in children in Victoria was bovine in type, while of those cases with lesions in the tonsils, cervical glands and mesenteric glands 71 per cent. were bovine in type. The mortality from non-respiratory tuberculosis has declined markedly during recent years and this is attributed partly to the measures employed in the control of bovine infection. Nevertheless it is considered that bovine tuberculosis of children is still a serious consideration, especially in view of the invalidity caused but not revealed in mortality statistics. The author does not consider that either commercial pasteurization or tuberculin testing of herds and elimination of reactors is sufficient guarantee against infection, and he recommends the boiling of all milk given to children.—W. I. B. BEVERIDGE.

I. —. (1935). **Prevention of Tuberculosis in Children.**—*Brit. med. J.* July 6th. 30-32.

II. —. (1935). **The Prevention of Tuberculosis in Childhood.**—*Ibid.* 21-22.

I. This is a report of the 21st Annual Conference of the National Association for the Prevention of Tuberculosis, the subject being the responsibility of the nation towards the child in respect of this disease. Several speakers referred to the question of bovine tuberculosis in relation to the main subject, and to steps taken in Great Britain and other countries to combat this source of infection.

II. An editorial comment on I.—E. BROWN.

WILCOCKS, C. (1935). **Tuberculosis in the Natives of Tanganyika Territory.**—*Tubercle, Lond.* January suppl. pp. 31-47. [11 refs.]

The author deals with tuberculosis in natives caused by bacilli of the human type. He says that the incidence of tuberculosis in Zebu cattle in Tanganyika Territory is very low. In 1931 he obtained negative results in a test of bulk milk from 110 cows.

BURROWS, S. M. (1935). **A Tuberculosis Survey of the Dinkas in the Eastern District, Bahr-al-Ghazal Province – Southern Sudan.**—*Tubercle, Lond.* January suppl. pp. 16-30. 3 figs. on 1 plate, 1 map. [3 refs.]

This article is an account of the origin and spread of tuberculosis in the Dinka tribe. The author states that imported cattle do not survive well in the province and accordingly the risk of introduction by this means is minimized. Fifty-six indigenous animals were tested by the double intradermal method and two gave a positive result. The tuberculin used was standard " old tuberculin." Out of a total of 173 cases of tuberculosis in human beings only 24 were non-pulmonary and the author considers that this low proportion indicates that the human strain is much more common in the tropics than the bovine strain.
—G. DODS MUNRO.

LEWIS, Evelyn S., RUCKMAN, Merle, & JAMES, Flora. (1935). **A Test for Filtrable Forms of M. tuberculosis using Ultrafilters.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 645-647. [1 ref.]

The filters used for this work were the ultrafilters of Krueger and Ritter, in which such factors as filter charge and adsorption play practically no part, the membranes operating on the principle of a sieve. With a 4·5 per cent. collodion membrane (with pore diameter $44m\mu$), and employing a negative pressure of 20 cm., no distortion of the membranes occurred and all bacteria were retained.

A freshly isolated strain of tubercle bacillus was grown on Sweaney's egg glycerol medium and in glycerin veal broth. In the former medium, after six weeks' incubation, regular bacillary forms and few granule forms occurred and, in the latter, after three months' incubation, granules predominated.

Centrifuged suspensions of these cultures in physiological saline were filtered through 4·5 and 5 per cent. collodion membranes, and the filtrates tested microscopically, culturally and by guinea pig inoculation. These animals were later tested with tuberculin in addition to being examined anatomically for lesions. (The organisms before filtration were shown to grow on Sweaney's medium and to be capable of infecting guinea pigs).

Three tests made with each type of membrane did not reveal the presence of a filtrable form.—A. BROWNLEE.

SAENZ, A., COSTIL, L., & SADETTIN, M. (1935). Fréquence et formes anatomo-cliniques de la tuberculose spontanée du cobaye. [**The Incidence and Form of Spontaneous Tuberculosis of the Guinea Pig**].—*C. R. Soc. Biol. Paris.* **119.** 266-269. [7 refs.]

In order to ascertain the risk of spontaneous tuberculous infection to normal guinea pigs, the authors made observations on 187 animals kept for periods varying from one month to two and a half years in direct or in indirect contact with animals infected with tuberculosis.

They found that 36 per cent. of the guinea pigs that had been in contact for from one to two and a half years contracted the infection. Direct and indirect contact appeared to give similar results. No cases of infection were observed under six months of contact. Pulmonary lesions predominated in the majority of the animals thus infected.—T. M. DOYLE.

WOODRUFF, C. E. (1934). **A Free Growth Period of Tubercle Bacilli in the Guinea Pig Omentum as Related to the Hypersensitive State.**—*Amer. J. Path.* **10.** 739-755. 36 figs. on 7 plates, 2 tables, 1 chart. [21 refs.]

This article is an account of experiments conducted by the writer upon

guinea pigs injected intraperitoneally with tubercle bacilli of the human type (strain H 37). The writer discusses the manner in which the tubercle bacillus is affected after inoculation in the normal and immune animal.

The experimental technique is described and also the preparation of omental " spreads " for examination from the experimental guinea pigs. It was found that the tubercle bacilli were first phagocytosed by polymorphonuclear leucocytes. The bacilli then grew freely in or on the cells of the omentum without attracting leucocytes by chemotaxis ; later they again attracted polymorphonuclear leucocytes.

In normal rabbits and in guinea pigs which had been rendered hypersensitive to tuberculosis, no free growth of inoculated tubercle bacilli occurred.

The question of resistance to tuberculosis in relationship to free growth and polymorphonuclear phagocytosis is discussed.—K. D. DOWNHAM.

McCARTER, Janet, & HASTINGS, E. G. (1935). **Cultivation of the Johne's Bacillus in a Synthetic Medium.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 741-743. [5 refs.]

The authors found that the bacillus of Johne's disease could be induced to grow in Dorset's synthetic medium under certain conditions without the addition of *Mycobact. phlei.* They consider that *M. phlei* provides accessory rather than essential growth factors.

" The conditions necessary for the growth of the Johne's bacillus on the synthetic medium are that the thin, even-surfaced rather than the thick, granular type of pellicle growth shall be used as the inoculum, and that a mass of growth at least 7 or 8 mm. in diameter per 50 c.c. of medium shall be used. The inocula are floated on the surface of the medium."

Growth on synthetic medium without the dead cells of *M. phlei* is never as profuse as on that containing *M. phlei.* It does, however, enable a preparation of johnin to be made free from proteins other than those of the bacillus itself.
—GWILYM O. DAVIES.

KALBFLEISCH, H. H. (1935). Zur Kenntnis der Verbreitung der Diphtheriebazillen im Tierreich : Diphtheriebazillen in einem Elefanten. **[The Distribution of *Corynebact. diphtheriae* in the Animal World. Diphtheria Bacilli in an Elephant].**—*Zlb. Bakt. I. (Orig.).* **134.** 383-390. 2 figs. [13 refs.]

The chief finding at the *post-mortem* examination of a young Indian elephant which died after an illness lasting 14 days was the presence of a necrotic pseudomembraneous pharyngitis and nodular necrotic pseudomembraneous colitis. Sections of these showed Gram-positive bacilli. Various cocci, *Bact. coli*, pseudodiphtheria bacilli and diphtheria bacilli were also cultivated from the throat. Toxin production could not, however, be demonstrated in the case of the diphtheria strains. Whilst the bacteria found in the false membrane from the throat are believed to be undoubtedly *C. diphtheriae* and are reported for that reason, the author does not consider that they were the cause of death.—A. W. STABLEFORTH.

SEDDON, H. R. (1934). **Caseous Lymph-Adenitis in Sheep.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 3061-3072. 1 table.

This is a review of the present state of knowledge regarding caseous lymphadenitis. The conclusions reached are that the causative bacillus is commonly spread by rupture of lesions in affected sheep and that the principal ingress of infection is through wounds. Shearing provides the most common source of wounds and these probably become infected when the sheep are released into the

yards, as was indicated by an experiment recorded. As a control measure, the guarding of newly-shorn sheep from infection is advocated, while trials of preventive vaccination have yielded promising results.—W. I. B. BEVERIDGE.

LOWEG. (1935). Erfahrungen bei der Rotlaufheilbehandlung. [**Treatment of Swine Erysipelas**].—*Dtsch. tierärztl. Wschr.* **43.** 548-549.

The doses given in this paper are for pigs of 220 lb. body weight. The author gave first 60 c.c. of swine erysipelas serum and, if necessary, 40 c.c. two days later. He repeated his inoculations until the temperature dropped and the appetite returned. He considers that the decisive dose is the large dose at the beginning. In acute cases he inoculated half the dose intra-abdominally and half intramuscularly. In subacute cases the proportions were one-quarter and three-quarters respectively. Most cases responded to this treatment. Occasionally in the second or third treatment stage an erythema of the skin appeared. The condition was usually fatal and the author found that by injecting 10 c.c. of " rephrin " he obtained recoveries in what would formerly have been considered hopeless cases.—G. D. M.

SEASTONE, C. V. (1935). **Pathogenic Organisms of the Genus Listerella.**—*J. exp. Med.* **62.** 203-212. 5 figs. on 2 plates, 1 table, 2 graphs. [8 refs.]

This is a study of certain Gram-positive bacilli which have been isolated by different workers from the following widely differing diseases :– a myocardial infection in a fowl, encephalitis in cattle and sheep, a generalized infection in rabbits and meningitis in man. The rabbit organism was named *Bact. monocytogenes* by MURRAY, who discovered it, owing to the blood changes which it set up in diseased animals. It is included in Bergey's " Manual of Bacteriology " under the genus " *Listerella.*"

Except for the immunological peculiarities of *Bact. monocytogenes*, the above-mentioned strains are indistinguishable. Their morphological, cultural, and serological characters are described. When injected into chickens, rabbits or guinea pigs, the organisms give rise to a characteristic monocytosis and extensive myocardial necrosis.—GWILYM O. DAVIES.

LOPEZ, C., & STEINER, A. (1935). Le choléra aviaire oculaire. [**Eye Lesions in Fowl Cholera**].—*Bull. Off. internat. Epiz.* **10.** 335.

Pasteurella aviseptica was isolated from 25 cases of eye lesions in fowls suspected of avitaminosis or fowl pox. The aetiological significance was not definitely determined.—J. E.

RISLAKKI, V. (1935). B. pyoseticum (viscosum) equi, täysikasvaneen hevosen munuaistulehduksen aiheuttajana. [*Bact. equirulis* **Infection of the Kidneys in a Horse**].—*Suom. Eläinlääkäril.* **41.** 149-154. 3 figs. [Abst. from German summary].

The author describes a fatal case of kidney infection in a four-year-old horse. *Bact. equirulis* was isolated from the abscesses in the kidneys and from the urine. Before the occurrence of the fatal kidney disease the horse had had a severe attack of strangles.

The author is of the opinion that the horse had been affected with *Bact. equirulis* when a foal, and that the infection had remained latent until the horse became weakened after illness.

BECKETT, F. (1935). **Necrotic Enteritis of the Pig and its Differential Diagnosis.** —*Vet. J.* **91.** 259-277. [23 refs.]

This article has been written purely from the point of view of the general practitioner in an attempt to show that, in a great number of outbreaks diagnosed as swine fever, the disease present is really necrotic enteritis. The breeding, management and feeding of a herd of three to four thousand pigs on one estate are fully described. There is a brief note of the early literature of swine epidemics. The outbreak discussed occurred during the years 1925 to 1928. Considerable portions of the paper are devoted to several aspects of swine erysipelas, swine fever, tuberculosis, parasites, anaemia, feeding and overcrowding. In sucking pigs, the mortality rate began to rise in September, then rose rapidly in November, reached a peak in January, and finally fell steadily. In adult pigs, the deaths were few and were evenly distributed throughout the year. There are constant references to mortality curves which are not shown.

The symptoms in sucking pigs were said to resemble those of iron deficiency in pigs, viz. pale colour, straight tails, loss of flesh, " thumps " and profuse diarrhoea. In store pigs, the chief signs were loss of appetite, dejected appearance, rise of temperature, blue to purplish-black changes in the skin and profuse offensive diarrhoea. There was never matting of the eyelids. Later, there was loss of flesh, unthriftiness, weakness of the hind quarters, anaemia and death from exhaustion. A high percentage of affected animals recovered but were stunted.

4,200 *post-mortem* examinations were made, and the findings are discussed under the following three age groups :–

(a) In unweaned sucking pigs the lesions were similar to those of iron deficiency, viz. dilated heart, fluid in the pericardial and pleural sacs, pale liver with paler areas in the centres of the lobules, white pancreas, pale kidneys and enlarged spleen ; at a later stage there was pneumonia and pleurisy ; gastritis and enteritis were constant and might be of a simple nature, diphtheritic or ulcerative ;

(b) In older pigs the lesions of the bowel were most marked ; there were four types, viz. (1) a slightly roughened condition of the mucous membrane ; (2) a thin greyish-yellow deposit ; (3) a thick greyish-yellow deposit easily detached from the mucous membrane, and (4) a thin black deposit which could not be removed by rubbing : ulceration was only encountered in 5 per cent. of cases.

(c) The *post-mortem* picture in adult pigs is not described.

Considerable space is devoted to what are termed " complicating factors ", and their treatment. They are swine erysipelas, tuberculosis, helminths, anaemia, feeding and overcrowding.

Amongst others, the author comes to the following conclusions :– (1) swine fever attacks pigs of all ages ; (2) necrotic enteritis is confined to animals under six months old ; (3) ulceration, *per se*, is not diagnostic of swine fever ; (4) in outbreaks of necrotic enteritis the use of formalin for the control of diarrhoea in sucking and store pigs is indicated ; (5) in attempts to control necrotic enteritis, the breaking up of a herd into small lots is of the utmost importance ; (6) it is essential that necrotic enteritis be recognized as a separate disease, and (7) by the recognition of necrotic enteritis outbreaks of so-called " mild swine fever " would cease to exist.—A. W. N. PILLERS.

HAFFKE, H. (1934). Enteritisbakterien bei gesunden und bei künstlich infizierten Enten. [**Paratyphoid Bacteria in Healthy and in Artificially Infected Ducks**].—*Inaug. Diss. Hanover*. pp. 22. 4 tables. [18 refs.]

Bacteriological examinations have been made on 1,170 samples of faeces from healthy ducks, geese, and other varieties of water-fowl ; the samples came from farms, fattening establishments, and the Hanover zoological gardens. On no occasion were paratyphoid organisms isolated. It is concluded that, in the absence

of actual disease in the stock, the paratyphoid organisms are very rarely excreted by water-fowl, and that in cases of food poisoning from ducks' eggs the infection is more likely to come through the ovary than the faeces.

Two ducks and two drakes which were given broth cultures of *Salmonella typhi-murium* (the Breslau bacillus) showed no symptoms of illness. Daily cultural examinations of their droppings showed these to be infected only up to the fifth day after feeding, while with agglutination tests a titre of 1 : 500 or more was reached in seven to 14 days, after which it receded to 1 : 100. They were killed about 40 days after infection, and cultures made from the various tissues and gut contents of each bird. Only from the spleen of one bird was the organism recovered, by the use of bile broth, the usual media being sterile.—NORMAN HOLE.

NAIDU, P. M. N. (1935). Essai de différenciation de *B. gallinarum* (Klein) et de *B. pullorum* (Rettger) au moyen de la bactériophagie. [**Differentiation of** *Salmonella gallinarum* **and** *S. pullorum* **by Means of Bacteriophage**].—*Bull. Acad. vét. Fr.* **8.** 306-311. 2 tables.

A short historical account is given of the original isolation of these organisms. The author compared the cultural and serological findings with the usual results. He carried out passage of the phage on both *S. pullorum* and *S. gallinarum* cultures. The phage survived *S. pullorum* passage but, although it always completely lysed all the strains used of *S. pullorum*, it never lysed *S. gallinarum*. The *S. gallinarum* passage of the phage died out and never lysed *S. gallinarum*, and only lysed *S. pullorum* at the fifth *S. gallinarum* passage, but not later.—NORMAN DOBSON.

URBAIN, A., & GUILLOT, G. (1935). Etude de l'action hémolytique de *Salmonella pullorum* et *Salmonella gallinarum*. [**The Haemolytic Action of** *S. pullorum* **and** *S. gallinarum*].—*C. R. Soc. Biol. Paris.* **119.** 1263-1264.

Experiments were carried out to test the haemolytic action of *S. pullorum* and *S. gallinarum*.

Using the red blood corpuscles of the horse, sheep, rabbit and fowl, entirely negative results were obtained, but with red blood corpuscles of the guinea pig a very slight action was recorded.—NORMAN DOBSON.

SCHLOTTHAUER, C. F. (1935). **Observations on Bang's Disease in a Large Dairy Herd Under Three Different Systems of Control.**—*N. Amer. Vet.* **16.** No. 6. 27-31. 1 table. [3 refs.]

Twelve years' experience of ten herds, numbering from ten to 385 head of cattle, has convinced the author that the disposal of reactors to the agglutination test is the only satisfactory method of dealing with *Brucella abortus* infection. An account is given of 11 years' observation of the disease in a large herd in the United States of America.

During the first year, 18·8 per cent. of the 154 calvings were abortions, there were 32 cases of retained membranes, 18 cases of clinical mastitis and 41 cows were sterile, whilst 17 per cent. of the calves died or were born dead. Eighty-eight of the cows were blood tested and of these 38·6 per cent. reacted (1 : 50 or higher).

For five years no attempt was made to segregate diseased animals ; the disease was of frequent occurrence in adult cattle whilst pneumonia and dysentery were almost constantly present among the calves. The losses were so great that during this period almost all the animals were replaced and the herd was greatly reduced in numbers. The following year rigid methods of segregation were used and during the next five years the whole herd was tested and reactors were sold. After isolation was adopted the symptoms of the disease declined and with blood testing the disease

was eradicated, with the result that there was a striking decrease in the number of retained membranes, and of cases of mastitis and of calf mortality.—H. E. BYWATER.

ANGELOFF, S. (1934). **Animal and Human Brucella Infection in Bulgaria and Measures for the Control of Bovine Contagious Abortion.**—*10 Annu. Univ. Sofia, vet. med. Fac. 1933-34.* pp. 355-392. [44 refs.] [In Bulgarian : abst. from German summary].

Bovine contagious abortion was first diagnosed in Bulgaria in 1924 and 188 cases were observed between 1924 and 1934. In 1933, 94 cases were diagnosed in 21 farms.

Up to the present time, six cases of undulant fever have been diagnosed serologically. Bovine contagious abortion has been made notifiable and suitable measures for its diagnosis and control have been instituted. These follow orthodox lines ; vaccination is prohibited.—J. E.

WHITE, G. C., & SWETT, P. P. (1935). **Bang's Disease Infection Transmitted to a Dairy Herd by Horses.**—*J. Amer. vet. med. Ass.* **87.** 146-150. [17 refs.]

In recent years it has been established beyond doubt that horses may become infected under natural conditions with *Brucella abortus*. So far, however, no evidence has been reported to show that horses infected with *Br. abortus* may be the source of infection in bovines. White and Swett present circumstantial evidence of such transference of infection. The herd concerned consisted of 14 animals when testing was begun in 1928. Reactors at this first test and at subsequent tests were removed and, from 1929 to 1932, no reactors or suspicious animals appeared. No animals were introduced except one or two bulls which proved to be negative. At the test carried out in March, 1933, six out of 15 animals of the milking herd reacted, three being cows and three bred heifers. During the following eight months five more reactors appeared. All were removed as soon as they appeared. The only probable source of infection is believed to be a cow which was placed in a " box-stall " in the horse stable during 1932 ; when she was removed three heifers were placed in the same stall at night, being allowed to run with the rest of the herd during the day. These four animals were amongst the first six reactors. Serum tests of the horses showed that two were " completely " positive for *Br. abortus* and two suspicious. The passageway between the stable and cow-shed was closed and the cows were subsequently kept away from the horses both when housed and when at liberty in paddocks or pastures. Since then monthly and bi-monthly tests carried out for 11 months have shown no further reactors. Apparently no abortion or premature calving occurred and no suggestion is given of the most likely way in which infection may have occurred. From the circumstantial evidence given it is, however, suggested that, where it is possible for horses to come into contact with the cows, the horses should be blood tested, and that similarly it may be necessary to test sheep or swine.—A. W. STABLEFORTH.

DOYLE, T. M. (1935). **The Distribution of *Br. abortus* in the System of " Carrier " Cows.**—*J. comp. Path.* **48.** 192-217. 31 tables. [10 refs.]

This investigation shows that *Brucella abortus* may be harboured in various body tissues of naturally infected cows some time after abortion. Thirty-two cows were examined and in 26 instances the organism was recovered from one or more tissues by guinea pig injection and culture. *Br. abortus* was isolated from the udder in 70 per cent. of cases (right hind quarter 60 per cent., right fore quarter 48 per cent., left hind quarter 44 per cent., left fore quarter 28 per cent.), the supra-mammary glands in 64 per cent., iliac glands in 52 per cent. and pharyngeal glands

in 28 per cent. of cases. The organism was also frequently found in other glands, in three instances in the spleen and once in the liver and bile. It is significant that examinations of the urine, faeces, kidneys, ovaries and uterus (two cases) were negative.

Examination of milk by guinea pig inoculation and whey agglutination tests confirmed the experience of previous workers that there is no definite correlation between the titre of the milk and the presence of the organism. Some samples of whey gave positive agglutination reactions, whereas cultures from the spleen of inoculated guinea pigs were negative. In other instances cultures were obtained when whey agglutination tests were negative.

Br. abortus was isolated from 63 per cent. of guinea pigs inoculated with known infected material.—GWILYM O. DAVIES.

AVVAKOUMOFF, M. (1935). **A Disease of Calves due to an Organism Apparently Belonging to the Brucella Group.**—*Sovyet. Vet.* No. 3. pp. 36-37. [Abst. from French summary].

In the course of research connected with the study of brucella infections, the author encountered a disease of calves which was the cause of serious losses. The affected animals were all under two months old. Serological and bacteriological examination showed that the causal agent was an organism which was considered to belong to the brucella group.—C. DAVENPORT.

HUDDLESON, I. F., & HERSHEY, A. D. (1935). **The Biological Activity of a Few Chemical Constituents of Brucella Cells.**—*J. Bact.* **29.** 58-59.

Brucella cells in a wet or dry state, and also the albuminoid substance present in the colloid obtained by centrifuging a suspension of autolysed cells, produce a rapidly fatal toxaemia in guinea pigs.

The nucleo-protein fraction produces an allergic reaction in brucella-sensitive human beings, but did not give a satisfactory reaction in the guinea pig, rabbit, monkey or cow.

The S substance, a non-protein, non-polysaccharide obtained from *Br. abortus* and *Br. melitensis*, stimulated production of precipitins, but not agglutinins, in guinea pigs.

The polysaccharide fraction recovered from the three species of *Brucella* was inactive biologically.—A. BROWNLEE.

HERSHEY, A. D., HUDDLESON, I. F., & PENNELL, R. B. (1935). **The Chemical Separation and Biological Activity of the Polysaccharide Constituent in Brucella Cells.**—*J. infect. Dis.* **57.** 183-185. 1 table. [2 refs.]

The authors have confirmed the claims of FAVILLI and BIANCALANI that a specific precipitating polysaccharide can be isolated from *Brucella abortus* by heat extraction. The authors, however, attribute the precipitating properties of this polysaccharide to a non-polysaccharide contaminant which they succeeded in separating from the crude preparation.—GWILYM O. DAVIES.

SCHÄFER, G. (1934). Prüfung der Abortus D-Vakzine Konstanz mit Hilfe des Meerschweinchenversuches. [**Guinea Pig Experiments with** *Brucella abortus* **D-Vaccine**].—*Inaug. Diss. Hanover.* pp. 32. 7 tables. [28 refs.]

The effect on the serum agglutinin titre of the administration of the following substances has been studied :– abortin, D-vaccine, " sero-abortan " plus abortin, and " sero-abortan " plus D-vaccine. The inoculation of D-vaccine produced titres from 1 : 100 to 1 : 1,500 in three to six weeks. Abortin did not produce so satisfac-

tory a rise of titre, nor did the oral administration of " sero-abortan " make any significant difference. [The nature of the D-vaccine and " sero-abortan " is not disclosed].—E. J. PULLINGER.

MEYER, K. F., STEWART, B., VEAZIE, L., & EDDIE, B. (1934). **Brucella Phagocytic Index Test.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 284-286. 1 table. [2 refs.]

This test is a method of detecting *Brucella abortus* infection in man. Serological and allergic skin tests may fail to show latent infection in the immune human being. The test is based upon the fact that the polymorphonuclear cells of infected persons have a greatly increased phagocytic activity. A suspension of *Br. abortus* is added to two drops of citrated blood, shaken and incubated in a water-bath for half an hour at 37°C. Films are made from the sediment and the average number of ingested bacteria in the granulocytes found. Persons never in contact with the organism showed an index below 1, whereas, in clinical cases or in persons who had recovered, research workers and veterinarians, it varied from 1 to 28.—A. W. T.

TAYLOR, R. M., LISBONNE, M., & VIDAL, L. F. (1935). La fièvre ondulante en France d'après les investigations du " Centres de Recherches sur la Fièvre Ondulante " de Montpellier. [**Undulant Fever in France**].—*Mouvem. sanit.* **12.** 51-90. 8 tables, 1 chart, 1 map.

The authors present a valuable review of their investigations of undulant fever in France, dealing firstly with the various methods of diagnosing the disease and secondly with its epidemiology in human beings. It is based upon 5,228 agglutination tests on blood or milk, 2,875 blood cultures and 882 guinea pig tests as well as complement-fixation and intradermal tests, etc. The serum agglutination test is regarded as the best method of diagnosing active and recent infections in man or animals, provided that the suspension is made from an entirely smooth (non-thermo-agglutinable) strain, and that proper care is taken in its preparation and use. The suspension is made from 48-hour growths on liver agar, heated for one hour at 60°C., formolized 2 : 1,000, and standardized to 280° by the Vernes photometer. For tests on animals the density of the suspension was reduced to half. Agglutination at 1 : 80 is regarded as indicating an active infection. This titre is extremely rare in France in people who have never shown symptoms suggestive of active infection. Of 927 Wassermann samples, 9 only were positive and in 7 (probably 8) enquiry revealed the classical syndrome of undulant fever. Negative reactions in known affected subjects occur, but are exceptional. The agglutination test was found to be slightly less sensitive than the complement-fixation test, but is preferred for its simplicity.

Full details are given of blood culture which is made in liver broth, emphasis being laid on the fact that 30 per cent. of positive results may not be apparent for at least ten days, and a further 6 per cent. for 20 days. All negative flasks are sub-cultured at ten-day intervals. All are incubated in both 10 per cent. carbon dioxide and in full air. With 1,300 blood samples (citrated) with which both blood cultures and agglutinations were put up, the proportion of positive cultural results increased regularly with increasing agglutinating titre from 2·2 per cent. for samples which were negative at 1 : 10 to 48·3 per cent. of those positive at 1 : 80 and 55 per cent. of those positive at 1 : 1,280, 30 per cent. of all being positive culturally. In the case of sheep and goats only 15 per cent. of samples which reacted at 1 : 80 were culturally positive. In a recently infected herd of goats 57 per cent. of positive cultures were obtained. In only two out of 46 cows whose blood serum had a titre of 1 : 80 was a positive cultural result obtained. These were infected with *Brucella melitensis*. Blood culture gave constant results in guinea pigs.

Allergic tests were made intradermally with filtered old culture, a "solution" of the proteids of the organisms, or with a suspension, preference being given to a filtered saline extract of the bacteria dried *in vacuo*, ground thoroughly, and adjusted to a nitrogen content of 1 cg. per 100 c.c. In tests of two thousand guinea pigs it was found that in general the results of intradermal agglutination and complement-fixation tests and cultures of blood or infected organs agreed. Certain definitely infected animals, however, failed to react allergically, and *vice versa*. In guinea pigs the agglutination test proved better than the intradermal test. In goats and sheep, a much higher percentage of positive intradermal results than positive agglutination results were found, e.g. examination of a recently infected herd of 142 goats showed that the intradermal reaction gave 31 per cent. more positive results than did the agglutination test. About four-fifths of the positive results by the agglutination tests were in accord with the results of blood or milk culture, whereas only a half of the positive intradermal results were thus confirmed. In intradermal tests on 200 exposed human beings, it was found that, whenever the history of a patient indicated undulant fever, a positive result was obtained.

The larger part of the review deals with the epidemiology of the disease in France. A map is given showing that in 1926 the disease had only been recognized in 17 departments, all in the south, Languedoc and Provence, whereas in 1932 it had already been found in 57 departments of the south, east and north-east with extensions into the west. It is thought probable that this represents a real extension and not merely a greater recognition of the disease. The disease is most frequent in spring. Children are not often affected and amongst them no sex differences were observed. In adults, however, the disease is two and a half times more frequent in males than in females. Sheep and goats form the main animal reservoirs in the Mediterranean provinces but, in the east, cows, which have in their turn been infected with *Br. melitensis* from sheep or goats, play a part. Infection of horses was always due to *Br. abortus*. *Br. melitensis* is the variety mainly responsible for undulant fever in France. *Br. abortus* only plays a small part in spite of its frequency amongst the cattle of the north. In the authors' series it caused 4·4 per cent. of human cases, always isolated. The porcine variety has never been met with in man or animals. Human infection is mainly acquired by contact with infected animals as is evidenced by the occupations of affected subjects. Ingestion of milk and milk products plays a very small part in rural districts but is chiefly concerned in cases occurring in towns. A striking correlation exists between the incidence of human undulant fever and the size of herds of goats or sheep kept and the percentage of actual abortions.

Attempts were made to type 643 strains of brucella isolated from man or animals by the methods described by HUDDLESON, viz. CO_2 requirements, production of H_2S, and the bacteriostatic action of thionin and basic fuchsin, the strains being assignable without difficulty to one or other type in 99 per cent. of cases. An instructive table is given showing their origin and geographical distribution, strains from human beings and various species of animals being shown side by side for the various regions.

Lastly immunity and prophylaxis are considered. Vaccination of animals is regarded as of little value. Pasteurization or boiling of milk for liquid consumption or for cheese-making is considered the best method of preventing the disease in urban districts but, in the country, prevention of contact infection is difficult and necessitates veterinary action, not only to decrease the percentage of actual abortions, but to eliminate the infected animal. Eradication by segregation is, however, difficult in the small herds of sheep or goats mainly concerned, and vaccination offers little hope at present. Any strain used for the purpose must be

thoroughly tested to assure that its attenuation of virulence is fixed. Every effort must be made to prevent *Br. melitensis* infection from spreading further, particularly amongst cattle.—A. W. STABLEFORTH.

HAVELKA, F. (1935). Přispevek k fevris undulans Bang. **[Contribution on the Subject of Undulant Fever].**—*Zverolék. Obz.* **28.** 41-47.

The author records the course of three cases of undulant fever in man. The source of infection in man in rural areas is contact with infected animals, and in cities the consumption of raw milk. Peroral infection with *Brucella abortus* Bang in man takes place when the resistance to the body is weakened by anaemia, catarrhal affection, etc.—E. PRIBYL (BRNO).

BENUSSI, L. (1935). Su di un focolaio de febbre ondulante da *Brucella melitensis* di origine bovina. **[A Focus of Undulant Fever due to *Br. melitensis* of Bovine Source].**—*Ann. Igiene* (*sper.*) **45.** 28-31. [8 refs.]

Four men became ill ten days after attending a cow that aborted a dead foetus, and two other peasants who had consumed raw milk were also affected. The milk was traced to the farm where this cow was kept. All six gave positive reactions for brucella infection at a titre of 1 : 1,200 and blood from the cow gave a positive agglutination reaction.

From blood cultures from five of the patients four strains were isolated (three from the men who had attended the cow and one from a man who had consumed raw milk). These were shown to belong to the *melitensis* type by their failure to produce H_2S and by their power to absorb completely agglutinins from an anti-*melitensis* serum.

Twenty-two goats had been imported into the district in 1932 and 18 of them had aborted during the year. The flock was sold and sent away from the district, but the infection had been passed on to sheep and cattle that grazed on the same pasture.

THOMPSON, R. (1934). **Undulant Fever and the Dairy Industry.**—*Sci. Agric.* **15.** 39-44. [11 refs.] [French summary].

Undulant fever was first recorded in Canada in 1928, and since then cases have been reported from every province except Prince Edward Island. There is little doubt that human infections with *Brucella abortus* exist to a much greater extent than has previously been considered. *Br. abortus* infection in cattle is wide-spread in Canada, and there is evidence that the pathogenicity of *Br. abortus* for the human subject is increasing. The mortality rates from undulant fever appear to be higher in Canada than in other countries. As there is no known satisfactory treatment for undulant fever, methods of control must be based on prevention of infection. The co-operation of the dairyman, the veterinarian, the physician and the public health authorities is needed to combat undulant fever successfully.—E. BROWN.

EDGAR, G. (1934). **The Causal Organisms of Entero-Toxaemia.**—*Aust. vet. J.* **10.** 209-212.

This paper opens with a review of the discovery and classification of the four members of the *Clostridium welchii* group. Bacterial examinations of bowel contents from cases of enterotoxaemia in New South Wales have confirmed the findings of BENNETTS in Western Australia. A simplified method of diagnosis which was found satisfactory was to filter the diluted ingesta only through filter paper and then inoculate rabbits intravenously. The toxin found in New South Wales was

identified as that of *Cl. ovitoxicum* by toxin-antitoxin neutralization tests.
—W. I. B. BEVERIDGE.

ROSE, A. L. (1934). **A Seasonal Survey of Entero-Toxaemia in Southern New South Wales.**—*Aust. vet. J.* **10.** 198-209.

The author reports extensive field observations, extending over eight years, on the sheep disease which, since the publication of BENNETTS' work, has been diagnosed as enterotoxaemia. The observations are in general agreement with those of BENNETTS, but a further type of the disease is described which causes loss of condition and foul-smelling diarrhoea. In such cases a weak toxin has been demonstrated and vaccination has produced marked improvement. The most characteristic features found on *post-mortem* examination of lambs and sheep freshly dead from enterotoxaemia are probably the empty condition of the small intestines and thickening and weakness of the walls of the terminal portion. In two outbreaks there were severe haemorrhages in the first portion of the small intestine, and these were thought to be due probably to an anaerobe differing from *Clostridium ovitoxicum.*

Although enterotoxaemia is most prevalent when luscious green feed is abundant, it sometimes occurs where the feed is dry. Losses are seldom encountered on lucerne paddocks but are common on young wheat or oats.

Methods of control which have been advocated by no means meet with uniform success. Yarding once a week and enforced exercise in some instances aggravated the mortality. Where practicable, weaning can be relied on to stop losses. The practical utilization of vaccination is greatly handicapped by the irregularity of outbreaks.—W. I. B. BEVERIDGE.

GILL, D. A. (1934). **Some Aspects of Entero-Toxaemia in New Zealand.**—*Aust. vet. J.* **10.** 212-216. 1 table. [7 refs.]

The possibility of types of *Clostridium welchii*, other than *Cl. ovitoxicum*, being present and causing disease in Australasia is discussed and considered not unlikely. The author's observations on predisposing factors agree with those of ROSE [see previous abst.], especially in that losses are not confined to fat animals ; all that can be stated is that the better the nutritive conditions the more likely is heavy mortality, but other factors sometimes come into play. Possible physiological explanations of the part played by factors influencing the incidence of the disease are discussed. The disease is probably precipitated by some disturbance of the digestive system which may be brought on by various conditions. Since the predisposing factors are so variable, no definite rule can be laid down for the control of the disease by animal husbandry.—W. I. B. BEVERIDGE.

MONTGOMERIE, R. F. (1935). **" Strike " of Sheep in North Wales.**—*Vet. J.* **91.** 350-356. [11 refs.]

In North Wales, the diseases of sheep characterized by sudden death can be classified mainly into three categories :– (1) braxy, associated with the invasion of *Clostridium septique* ; (2) pulpy kidney in lambs, associated with *Cl. ovitoxicum*, and (3) " strike ".

This third disease affects adult sheep. Incidence of cases coincides closely with a quick growth of young pasture, and cases occur particularly between the middle of March and the middle of April. The application of artificial manures, particularly basic slag, apparently tends to lead to an increase in the number of cases. Congestion of the mesenteric vessels, a distinct, variable, often patchy congestion of the small intestine, pulpy kidney if the *post-mortem* examination be

made two hours or more after death, excess of pericardial fluid, subepicardial haemorrhages and, most characteristic, subendocardial haemorrhages in the left ventricle are the principal autopsy findings. The duodenal contents were not toxic, but those of the remainder of the small intestine, particularly the jejunum, were found to be very toxic for mice and sheep by intravenous injection ; in the latter animal, the symptoms and *post-mortem* findings resembled those of the natural cases. Only sera containing *Cl. welchii* Type D antitoxin neutralized this toxin. *Cl. welchii* Type D was isolated from the intestinal contents of three cases. Cultural examination of the organs of four cases newly dead showed that bacterial invasion does not occur prior to death.—A. BROWNLEE.

BELKIN, G. J. (1935). La nécrose coagulante bacillaire du foie chez le cheval. [**Bacillary Necrosis of the Liver in the Horse**].—*Rev. vet., Toulouse.* **87.** 348-354. 3 figs. [11 refs.]

This is a description of the macroscopic and microscopic characters of necrotic lesions which were met with in the liver, spleen and kidneys of an 11-year-old stallion. The *post-mortem* examination was carried out four hours after death. In the liver, the necrotic areas were greyish-white in colour and penetrated deeply into the hepatic tissue. Histological examination showed that certain of the lesions in the liver were surrounded by a zone of marked cellular reaction, with a transition zone between the necrotic tissue and the reacting tissue. Gas bubbles were also observed. Bacteriological examinations revealed the presence of *Clostridium welchii*, and the author concluded that this organism appeared to be responsible for the condition. While other anaerobic organisms, notably *Cl. oedematiens*, *Cl. septique* and *Cl. histolyticum*, have been associated with necrosis of the liver, the author has been unable to trace any reference in the literature to *Cl. welchii* as being associated with, or responsible for, liver necrosis.—D. R. W.

JORDAN, E. O., & BURROWS, W. (1935). **The Production of Enterotoxic Substance by Bacteria.**—*J. infect. Dis.* **57.** 121-128. [31 refs.]

Staphylococci and streptococci which cause food poisoning and are capable of producing exotoxins, when first isolated, rapidly lose this power of toxin production. By growing such organisms on veal infusion agar or other basic medium containing 1 per cent. of starch, this toxigenic power is restored. Toxin production of bacteria when grown on this medium was demonstrated using staphylococci, streptococci, *Bact. coli*, *Bact. aerogenes*, *Proteus vulgaris* and *Salmonella typhimurium*. Toxin was demonstrated by the symptoms of gastro-intestinal disorder shown by monkeys when fed toxic filtrates. Monkeys are much less susceptible than human beings to such food poisoning.—E. J. PULLINGER.

BENNETT, S. C. J. (1935). *Cryptococcus* **Infections.**—*Rep. vet. Dep. Sudan. 1934.* pp. 24-25.

Details are given concerning a horse recorded in last year's report as being still under observation (case d, p.24). The horse showed intermittent watery and purulent nasal discharge, in both types of which cryptococci were occasionally to be found. The horse was kept under observation, and apart from the foregoing symptom remained normal and in good condition for three and a half months before being finally destroyed. On *post-mortem* examination no lesion of any kind was discovered. Smears for microscopic examination were made from all the head cavities, the nostrils, trachea, lungs and associated lymph glands. No cryptococci were detected except in smears from the posterior (ventral) meatus. This case is remarkable for at least four features, namely, (1) the intermittent

nature of the discharge ; (2) the fact that the discharge was sometimes watery and sometimes purulent ; (3) the occasional (not constant) presence of cryptococci in both types of discharge, and (4) the fact that no lesion could be detected on *post-mortem* examination, although destruction was delayed for three and a half months.

BAUMANN, R. (1935). Intrauterin erworbene Allgemeininfektion mit Schimmelpilzen bei einem 3 Tage alten Kalbe. [**Congenital Fungous Infection in a Three-Day-Old Calf**].—*Dtsch. tierärztl. Wschr.* **43.** 276-278. 2 figs. [10 refs.]

A case is described of a three-day-old calf which died and at autopsy showed generalized yellow foci from which a fungus [not named] was isolated. From the wide-spread nature of the lesions and the granulomatous tissue reaction to infection in so young a calf, it must be assumed that the original infection took place *in utero*.—E. J. PULLINGER.

GREGORY, P. H. (1935). **The Dermatophytes.**—*Biol. Rev.* **10.** 208-233. 1 table. [94 refs.]

This publication is a review of the recent literature concerning the biology of dermatophytes ; it begins where a previous survey by TATE [(1929). *Biol. Rev.* **4.** 41.] left off. The subject is dealt with from the following aspects :- the parasitic phase, the saprophytic phase, the affinities of the group with other fungi and classification. [It is a most interesting and concise account and should be read by all interested in this subject].—GWILYM O. DAVIES.

I. KOSER, S. A., & SAUNDERS, F. (1935). **Growth Factors in Relation to Development of Certain " Fastidious " Bacteria.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1267-1269. 1 table. [4 refs.]

II. KOSER, S. A., SAUNDERS, F., FINKLE, I. I., & SPOELSTRA, R. C. (1935). **Sources of Growth Factors Required by Certain " Fastidious " Bacteria. Failure of Ascorbic Acid to Replace Growth-Promoting Principles.**—*Ibid.* 1270-1271.

I. The authors have, by the use of charcoal, separated from ordinary veal infusion certain unknown substances necessary for the growth of some organisms. These substances were subsequently recovered by extraction from charcoal with hot ethyl alcohol or hot acetone and then from the latter by evaporation. These extracts were capable of " activating " an infusion from which growth factors had been removed and of making a standard veal extract peptone broth more suitable for fastidious organisms. The addition of these substances to synthetic media rendered the media suitable for the growth of diphtheria bacilli and other organisms.

II. In order to gain information concerning the natural sources of these growth factors, over 30 different animal and plant tissues were extracted by the charcoal method and the extracts added to synthetic media. The results showing the comparative potency of the preparations are given and these indicate useful sources of growth-promoting principles.

Ascorbic acid could not be substituted in synthetic media for the unknown growth-promoting substances extracted from animal and plant tissues.

—GWILYM O. DAVIES.

TIXI, G. (1934). L'azione dei raggi U.V. marginali o della zona di penombra sulla vitalità dei microbi. [**Effect of Ultra-Violet Rays on the Vitality of Bacteria**].—*Igiene mod.* **27.** 357-367. 2 figs. [12 refs.] [Abst. from abst. in *Zlb. Bakt. I. (Ref.).* **118.** 396].

A study of the effect of ultra-violet rays on the vitality of *Bact. coli*, *Bacillus anthracis*, *Staphylococcus aureus*, *Saccharomyces cerevisiae* and *Trichophyton violaceum*. Penumbral ultra-violet rays have a slower bactericidal action than direct rays.

DISEASES CAUSED BY PROTOZOAN PARASITES.

PARKIN, B. S. (1935). **Symptomatology of Some Trypanosomiases of Domestic Animals.**—*Onderstepoort J. vet. Sci.* **4.** 251-267. 8 figs., 12 charts. [3 refs.]

The symptomatology is described under three headings :– (1) *Tryp. congolense* infection in cattle, sheep and swine ; (2) *T. brucei* infection of horses, sheep and dogs, and (3) *T. vivax* infection in cattle. All the animals under observation were infected by inoculation of blood and were kept under laboratory conditions. The symptoms were found to agree very closely with those described in these infections under field conditions. The author suggests that calves of premunized cows may possibly obtain some immunity through the milk. *T. brucei* infection in sheep produces very mild symptoms. *T. vivax* in cattle kept under laboratory conditions takes a very mild course and it is difficult to find the parasites in the blood.—E. M. ROBINSON.

VAN SACEGHEM, R. (1935). Précautions à prendre lors de la vaccination contre la peste bovine afin de ne pas transmettre la trypanose. [**Precautions against the Transmission of Trypanosomiasis during Vaccination against Rinderpest**].—*Ann. Soc. belge Méd. trop.* **15.** 277-278. [1 ref.]

Attention is drawn to the danger of transmitting trypanosomiasis with the virulent blood used in vaccine-virus immunization. The author recommends the addition of tartar emetic to the blood, as this drug kills the trypanosomes at a dilution of 1 : 20,000 and does not destroy the virus content or provoke abscess formation if added to the blood in the proportion of 1 cg. to 1,000 c.c. of blood.
—U. F. RICHARDSON.

POINDEXTER, H. A. (1935). **Further Observations on the Relation of Certain Carbohydrates to *Trypanosoma equiperdum* Metabolism.**—*J. Parasit.* **21.** 292-301. 4 tables. [7 refs.]

This article records *in vivo* and *in vitro* experiments on the effects of carbohydrates on the vigour of *T. equiperdum*. Guinea pigs were injected intraperitoneally with insulin to deplete the normal carbohydrates of the blood. When injected with quantities of insulin sufficient to cause non-fatal shock the return of the blood sugar to normal in healthy animals was more rapid than in infected animals, and it was found that the amount of insulin required to produce shock decreased as the infection progressed. The injection of insulin decreased the rate of multiplication of the trypanosomes as judged by the examination of blood taken from the peripheral circulation, and infected animals injected with insulin lived longer than similar untreated animals. Trypanosomes from an insulin-injected guinea pig, on inoculation into rats, proved less virulent than the normal strain. The results of the *in vitro* experiments were judged on the survival time, rate of motion and the length of retention of virulence of trypanosomes in various solutions containing glucose or devoid of it. The best results were given in Locke's solution and other solutions containing glucose.—U. F. RICHARDSON.

DUKE, H. L. (1935). **Old "Laboratory" Strains of the Polymorphic Trypanosomes.**—*Lancet.* **229.** 665-667. [3 refs.]

The author draws attention to the modification of characteristics which may occur in a trypanosome strain if it has been maintained for years by direct passage. Such modifications may render experiments carried out on old laboratory strains of little more than academic interest. The conferring of arsenic resistance on strains of *Tryp. gambiense*, for instance, has been found to be associated with a loss of the power of developing in tsetse, and it is probable that such strains could not survive in nature. The response to drug treatment has also been found to vary with the accommodation of the parasite to its host, and this character may also be modified by maintenance in the laboratory. It is suggested that one of the routine tests of the degeneracy of laboratory strains of polymorphic trypanosomes should be their behaviour in tsetse, to ascertain whether they still retain the power of normal cyclical development:—U. F. RICHARDSON.

KOFOID, C. A. (1934). **American Trypanosomiasis. The Northward Extension of Brazilian Trypanosomiasis, or Chagas' Disease, among Mammals in California.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 3075-3078.

The author is convinced from studies on *Triatoma protracta* that *Tryp. cruzi* infection extends northward into Californian territory, at least in bugs. The endemic infection in these bugs in California is confined to those living in the nests of wood rats, but no *T. cruzi* infection has been detected in these animals which, however, sometimes harbour *T. lewisi.*—U. F. RICHARDSON.

ROGGIO, B. (1934). Sulla eventuale influenza della Spirochaeta duttoni, hispanica e Spirella morsus muris sulle trypanosomiasi da Trypanosoma brucei, pecaudi, equinum et evansi. [**The Influence of** *Spirochaeta duttoni, S. hispanica* **and** *Spirella morsus muris* **on Infections by** *Tryp. brucei, T. pecaudi, T. equinum* **and** *T. evansi*].—*Arch. ital. Sci. med. colon.* **15.** 60-68. [English, French and German summaries : abst. from orig.].

This article records experiments undertaken to ascertain whether the influence of spirochaetes on the course of a trypanosome infection was a general phenomenon or confined to certain species. Mice were infected with *S. duttoni*, *S. hispanica* and *Spirella morsus muris* [*Spirillum minus*] and were later inoculated intraperitoneally with the four species of trypanosomes, control animals being inoculated with the trypanosomes alone. All the species of spirochaetes proved effective in prolonging the lives of mice infected later with any of the four species of trypanosomes. White mice inoculated with *Spirillum minus* developed an infection which proved fatal. [The summaries in foreign languages are very brief and give no information as to the results of the experiments].—U. F. RICHARDSON.

VALCARENGHI, E. (1935). Sulla leishmaniosi canina. [**Canine Leishmaniasis**].—*Profilassi.* **8.** 121-131. 6 figs., 1 table. [49 refs.] [English and French summaries : abst. from orig.]

This article describes a case of canine leishmaniasis detected in Milan in a dog which had been brought from Alexandria. The animal showed ulceration and tumefaction of the skin, extensive areas of furfuraceous eczema and keratitis. Leishmania were detected in skin scrapings and they were also present in small numbers in the peripheral blood, included in cellular elements or free in the plasma. The serum gave positive reactions to the formol-gel test and to a gel test with lactic acid, negative reactions being given by control sera and by serum from an animal infected with trypanosomiasis. The author discusses the aetiology,

pathogenesis and transmission of canine leishmaniasis, and suggests that the cutaneous lesions described were probably secondary to visceral infection. [This, although an account of a single case, emphasizes the necessity that veterinarians should keep a watch for canine leishmaniasis].—U. F. RICHARDSON.

HEGNER, R., & ESKRIDGE, Lydia. (1935). **Elimination and Cross-Infection Experiments with Trichomonads from Fowls, Rats and Man.**—*Amer. J. Hyg.* **21.** 135-150. 2 tables. [8 refs.]

Of the thousands of rats used by the authors in their experimental work, 85 per cent. were found to be infected with trichomonads which normally inhabit the caecum, but are also present in the colon on the way out of the body in the faeces. The trichomonad infection in rats can be eliminated by resorcinol or by 1 per cent. carbarsone supplied to the rats as drinking water. Copper sulphate is destructive to *Trichomonas hominis* in culture but, when administered to rats *per rectum* or directly into the caecum in 1 to 5 per cent. solution, the animals all died. Viscous substances, of which the most efficacious was gum arabic, added to the diet reduced the trichomonad infection in rats but did not eliminate it.

In chickens infected with fowl trichomonads, the administration of carbarsone *per os* eliminated the infection in one to seven days. The trichomonas infection showed little tendency to spread from infected to healthy rats in the same cage when a dish containing water was supplied for drinking, but spread rapidly when the water was replaced by culture medium.

Rats from which trichomonads had been removed by carbarsone treatment were successfully infected *per os* with *T. hominis* from man in culture.—U. F. R.

KUBESCH, W. (1935). Spezifische Deckinfektion (Frühabortusseuche) beim Rind. [**Trichomonad Abortion in Cattle**].—*Wien. tierärztl. Mschr.* **22.** 513-524. [Numerous refs.]

This article gives a very complete account of trichomonad abortion, its clinical symptoms, aetiology, treatment, prevention and eradication, compiled from the recent publications of experts who have been studying the various aspects of this disease.—U. F. RICHARDSON.

HEGNER, R., & ESKRIDGE, Lydia. (1935). **Absence of Pathogenicity in Cats Infected with *Trichomonas felis* from Cats and *Trichomonas hominis* from Man.**—*Amer. J. Hyg.* **22.** 322-325. [1 ref.]

This article records the infection of cats with strains of *T. hominis* and *T. felis*. All the experimental animals became infected, and a considerable mortality occurred due to accidental causes, but no pathological alteration of the intestinal walls could be detected. One experiment is recorded in which infection was transmitted from cat to cat by contact. Carbarsone treatment was successful in freeing the animals from trichomonads except in two cases, in which it is suggested that reinfection by insect transmission may have occurred.—U. F. RICHARDSON.

LAMONT, H. G. (1935). **Coccidiosis in Bovines and Poultry.**—*Vet. Rec.* **15.** 1028-1044. 1 table. [50 refs.]

This paper is a review in three parts, dealing with general aspects of coccidiosis, and the disease in bovines and poultry. In the first section the author critically reviews literature dealing with the viability of oocysts in soil and manure, under laboratory conditions and on farming equipment and their destruction by cold, heat, putrefaction, desiccation, exposure to sunlight and by disinfectants. He

records an experiment in which infected faeces, smeared on egg-shells and incubated for three weeks, proved innocuous when fed to chickens.

In the second part an acute case of coccidiosis in an eight-year-old bovine is reported. In summarizing the curative measures recorded the author concludes that prevention of reinfection by keeping the animal tied up indoors and good food are the only measures of importance.

The third section deals with the relation between coccidiosis and paralysis in fowls. The general trend of the author's opinion appears to be that non-specific paralysis is common in outbreaks of coccidiosis. A publication is promised which will provide evidence that the feeding of acids and buttermilk to chickens does not alter the pH of the intestinal contents and that good results following feeding with milk preparations are probably due to the increased nutritive value of the ration.—R. S. Roberts.

Hoare, C. A. (1935). **The Endogenous Development of the Coccidia of the Ferret, and the Histopathological Reaction of the Infected Intestinal Villi.**—*Ann. trop. Med. Parasit.* **29.** 111-122. 3 text figs., 9 figs. on 1 plate. [3 refs.]

Reference is made to a previous work in 1927 in which two coccidia of the genus *Eimeria* and one *Isospora* were described in the ferret. The present paper describes the endogenous development of the two *Eimeria* species.

Both coccidia develop exclusively within the epithelial cells of the intestinal mucosa. *E. furonis* affects the cells over the whole villus, but there is a greater concentration of invaded cells near the tip. Parasites in all stages of development were present in a ferret infected by one feeding and there was no tendency for the parasites to fall into " age groups ". The invaded tissue undergoes very little histological alteration. *E. ictidea* affects the cells at the tip of the villus, the cells in the crypts being entirely free of parasites. The infection appears to proceed in a uniform manner and in a ferret infected by one feeding the younger stages in the endogenous cycle were absent at the time of the examination. The parasites were in age groups, i.e. those in any one stage of the life-cycle were always found in groups, whilst in *E. furonis* examples of all stages were found indiscriminately intermingled in any one villus.

The infection calls forth a peculiar histopathological reaction. Normal repair of a gap in the epithelium at the tip of the villus occurs by division of cells in the crypts followed by a thrusting of the column of cells towards the tip. In *E. ictidea* infection this process appears to be interfered with by the mass of parasites remaining *in situ*, with the result that a cylinder of epithelial cells forces its way inwards into the core of the villus or outwards to form a cup around the infected tip. There is no reason for supposing that this is a defensive mechanism because the development of the parasites is not interrupted and oocysts are liberated in a normal way from the disconnected tip.—R. S. Roberts.

Dini, D. (1934). Una grave epizoozia di Theileriosi da Theileria annulata. [**A Serious Outbreak of Theileriasis** (*Th. annulata*)].—*Profilassi.* **7.** 166-168. [English and French summaries : abst. from orig.]

After the autumnal rains in the Sulcis district of Italy, a herd of about 60 cattle were moved from the plains to mountain grazing and ten days later several animals became ill, some dying suddenly. The symptoms were inappetence, progressive emaciation, haemoglobinuria, anaemia and a slight rise of temperature. On *post-mortem* examination, subcutaneous haemorrhage and oedema were found, the mucous membranes were jaundiced, there was evidence of gastro-enteritis,

the spleen was slightly enlarged and the lymphatic glands were hypertrophied and haemorrhagic. There was no evidence of a bacterial infection and plant poisoning was excluded. Histological examination of the spleen, liver and lymph glands revealed, however, the presence of typical Koch's bodies and a diagnosis of theileriasis was made [no mention of blood examination].

The author concludes that an acute, subacute or chronic form of the disease may be met with. The incubation period of the acute form which was always fatal was 8 to 15 days and that of the subacute form 10 to 15 days. Animals affected with the chronic form remained ill for several months.—J. A. NICHOLSON.

CUILLÉ, J., CHELLE, & BERLUREAU. (1935). Existence en France d'une anaplasmose bovine d'origine indigène. [**The Existence of an Indigenous Bovine Anaplasmosis in France**].—*C. R. Acad. Sci., Paris.* **200.** 1994-1996.

This article records an outbreak of bovine anaplasmosis in the south-east of France due to a strain of organism which assumed a marginal position in the red corpuscles. Although some deaths occurred, these are ascribed to a combination of the disease and a heavy infestation with intestinal parasites, the anaplasma infection itself being regarded as benign.—U. F. RICHARDSON.

CUILLÉ, J., CHELLE, & BERLUREAU. (1935). Identité de l'anaplasmose ovine française et algérienne. [**The Identity of French and Algerian Ovine Anaplasmosis**].—*C. R. Acad. Sci., Paris.* **201.** 179-180. [1 ref.]

The authors record the inoculation of two sheep immune to French anaplasmosis and three non-immune controls with an Algerian strain of the organism. The immune sheep exhibited only a mild febrile reaction, whilst the control sheep developed a severe febrile reaction which lasted five days, and was associated with anaemia, prostration and emaciation.—U. F. RICHARDSON.

BOYNTON, W. H., & WOODS, Gladys M. (1935). **A Serum Reaction observed in Anaplasmosis.**—*J. Amer. vet. med. Ass.* **87.** 59-63. 3 tables. [4 refs.]

In testing the value of the mercuric chloride test for the detection of bovine anaplasmosis, it was found that positive reactions were obtained in the tubes containing the water controls. A test was then carried out with 197 sera using water alone ; there were 56 positive reactions, of which 49 were sera from known or suspected cases of anaplasmosis, and five sera were from animals infected with Texas fever, and possibly also with anaplasms. To perform the test 2 c.c. of distilled water is placed in a small test tube, two drops of serum are then dropped into the water and the tube is shaken. A reaction is called positive if, after allowing the tube to stand for 12 or more hours, a cloudy precipitate settles and forms a white blanket over the bottom of the tube. The principle upon which the test is based is probably the precipitation of euglobulin in high aqueous dilution, but the reaction, apparently, does not depend upon quantity alone. In general the euglobulin content of normal animals and of animals infected with other maladies, both of which reacted negatively to the test, was as great as that of anaplasma-infected animals. The mercuric chloride reaction is not specific as it has also been observed in kala azar and in camel trypanosomiasis.—U. F. RICHARDSON.

SCHARRER, Berta. (1935). Ueber das Verhalten von Tauben gegenüber Infektionen mit verschiedenen Hühnerspirochätenstämmen. [**The Resistance of Pigeons to Infection with Different Strains of Fowl Spirochaetes**].—*Z. Hyg. InfektKr.* **117.** 163-170. [16 refs.]

Inoculation of large doses of spirochaetes virulent to pigeons produced in

them an infection demonstrable by microscopic examination of the blood. Small doses, on the other hand, produced a type of infection which could not be demonstrated by microscopic means, though survival of the parasites could be proved by subsequent subinoculation into a fowl. A similar state of affairs was found to occur in fowls. Under certain conditions a strain of fowl spirochaete survived in the fowl but could only be demonstrated by inoculation into pigeons.
—E. J. PULLINGER.

WENRICH, D. H. (1935). **Host-Parasite Relations between Domestic Animals and their Protozoan Parasites.**—*Vet. Ext. Quart. Univ. Pa.* **35.** No. 58. pp. 23. 21 figs. on 2 plates, 1 chart. [29 refs.]

This is a general discussion of the relations between protozoan parasites and their hosts. Types of association, host defence, the mechanism of immunity, modes of transmission and parasitic reservoirs are amongst the problems discussed in general, whilst more detailed consideration is given to these processes as they are exhibited in connexion with coccidia, babesia, trichomonads, histomonas and trypanosomes.—U. F. RICHARDSON.

COLES, J. D. W. A. (1935). **A Rickettsia-like Organism and an Unknown Intracellular Organism of the Conjunctival Epithelium of Goats.**—*Onderstepoort J. vet. Sci.* **4.** 389-395. 6 figs. [3 refs.]

The author describes a rickettsia-like organism associated with the conjunctival epithelium of goats in cases of specific ophthalmia. A further intracellular organism of the conjunctival epithelium in these animals is described. The rickettsia-like organism is very pleomorphic and shows solid forms, ring forms, imperfect rings, triangles and bipolar forms.—E. M. ROBINSON.

DISEASES CAUSED BY VIRUSES.

CURASSON, G. (1935). Recherches et remarques sur le traitement préventif et curatif de la péripneumonie bovine. [**Preventive and Curative Treatment of Contagious Bovine Pleuro-Pneumonia**].—*Bull. Acad. vét. Fr.* **8.** 352-358. [5 refs.]

Formolized vaccine against contagious bovine pleuro-pneumonia is prepared by allowing formol in a concentration of four parts per 1,000 to act on infected serous exudate for 48 hours. Such vaccine has given good results in the control of the disease in Africa. Good curative results are considered to have occurred following the use of novarsenobenzol.—E. J. PULLINGER.

KAKIZAKI, C. (1934). **Rinderpest, its Control and Differential Diagnosis in Chosen.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 2911-2913. Discussion p. 3091. 1 table.

In Chosen, a rinderpest-immune zone 800 miles long by several miles wide has been created by inoculating cattle with vaccine to protect against the annual invasions of the disease from Manchuria. The vaccine consists of ground spleen, lymph gland, thymus, tonsil and lung of animals killed at the height of the disease, thymus being the most active ingredient. 8 to 10 per cent. of toluol is added, and the vaccine is incubated at 37° to 38°C. for ten to 14 days. It is said to keep at room temperature for two years and to confer immunity for eight months. 266 cases of rinderpest occurred in the vaccinated area in 1931. For diagnosis of isolated cases of disease a complement-fixation test has given good results in a

limited number of experiments ; the unheated serum of hyperimmunized cattle provides the antibody, and the boiled extract of the lymph glands, spleen or tonsil of animals suspected to be infected is the antigen.—U. F. RICHARDSON.

D'COSTA, R. S. J. (1935). **Studies on Rinderpest Susceptibility of Cattle.**—*Indian vet. J.* **12.** 2-7.

This article discusses the variation in the susceptibility of cattle to rinderpest in view of the importance of this factor in the control of the rinderpest reaction by varying the dose of anti-rinderpest serum. Attention is drawn to the influence of breed, age, climatic and hygienic conditions. The importance of enzootic rinderpest on the production of a resistant breed is stressed and it is recommended that " in the absence of any reliable information regarding a breed whose susceptibility is not known, it is a good practice to ascertain the frequency of outbreaks in the locality among the cattle and the approximate percentage of mortality and judge the degree of susceptibility accordingly."—U. F. RICHARDSON.

FORSSMAN, J. (1933). Vissa praktiska erfarenheter från den senaste mul- och klövsjukekampanjen i Skåne. [**Some Practical Experiences from the Last Foot and Mouth Disease Campaign in Skane (Sweden)**].—*Svensk VetTidskr.* **38.** 43-58. [2 refs.]

Some experiences during the campaign against two simultaneous epizootics of foot and mouth disease (December, 1929, to May, 1932) in Sweden and Denmark respectively, led the author to discuss the efficacy of the different methods of control adopted in the two countries, for the sake of future campaigns. During a period of 27 months, 216 herds became affected in Sweden, chiefly in one county (Malmöhus län), whereas in Denmark in the same period the disease spread to 13,860 herds, most of them being confined to the Isle of Zealand. Some factors that might have influenced the spread of the disease are quoted, such as the type of virus, this being shown to belong to the Vallée O type in both cases ; the source of infection, which in both outbreaks was traced to Germany ; the chance of reintroduction of the infection ; the size of the areas concerned, and the animal population and mode of husbandry.

In Sweden all affected herds except 18 were slaughtered as soon as the infection was recognized. Clinically affected animals were destroyed, and animals exposed to contact were sent without delay to an approved abattoir for slaughter. In Denmark control by segregation alone was practised. Taking into account the facts mentioned above, together with the conspicuous differences between the results of the campaign experienced in the two countries, the author prefers the method adopted in Sweden. To a limited extent (18 herds) a very strict isolation method was employed in Sweden, and only in cases where the herd was very valuable and where the conditions on the premises would allow such a procedure. In spite of whole-time supervision by a veterinarian staying on the farm until the herd was declared non-infective, and of the control of the movements of the animals, the source of infection in six new outbreaks could be traced back to five of these segregated herds.

Regarding the expenditure caused by the epizootic in both the countries, the author has summarized the public expenses only, because exact figures showing the total losses were not available. From these figures it will be seen that there is little difference between the expenditure in the two countries. However, taking into consideration the alarming spread of the disease in Denmark and the lowered milk yield, etc., caused by it, there is no doubt which method is the most expensive. It must be remembered, however, that the slaughter method has its disadvantages ;

if it is to be efficient it must be put in operation during the first outbreaks of an epizootic.

In chapter IV of the article the author deals with certain imperfections connected with the slaughter method, especially the risk of disseminating the infection by the transport of exposed animals to the abattoirs. In an addendum to the article is a report, reprinted *in tote* by the director of the abattoir in Malmö, in which he points out some of these imperfections.—G. N. (FARSUND).

DEBELIĆ, S. (1935). Slinavka i sap. (Aphtae epizooticae) kod zivotinja u Jugoslaviji. [**Foot and Mouth Disease in Yugoslavia**].—*Vet. Arhiv.* **5.** 378-382. 2 tables, 1 chart. [Abst. from German summary].

According to official records, foot and mouth disease occurred in Yugoslavia in 1924, serious outbreaks being reported in 18 departments, 67 districts and 225 villages. There were fewer cases during the following year, only one-quarter of the departments being affected and a few detached districts and villages. There were no outbreaks in 1926, and no further outbreaks were reported during 1927 to 1928.

STRIEGLER, E. (1934). Die Züchtung des Maul- und Klauenseuchenvirus. [**Cultivation of the Virus of Foot and Mouth Disease**].—*Arch. exp. Zellforsch.* **15.** 431-436.

Experiments on the cultivation of the virus of foot and mouth disease have shown that, in the presence of squamous epithelium from the skin of embryo guinea pigs, virus could multiply one thousandfold during a few days' incubation. In another investigation virus was sub-cultured 30 times in the course of 174 days ; during this period fluctuations in the virulence of the virus were observed. In yet another experiment, which lasted nine months, virus was sub-cultured 17 times, was filtered 16 times, was diluted $4{\cdot}8 \times 10^{39}$ times and still retained its virulence. This is considered to be reasonably conclusive evidence of multiplication of virus.

Other investigations have shown that, besides skin, embryo tissues from other parts of the guinea pig constitute suitable media for reproduction of virus. Virus multiplies readily at temperatures between 30° and 37°C. Lower temperatures are less favourable for growth. A pH range from 6·9 to 7·6 is satisfactory for multiplication, the optimum being in the region of 6·9.—E. J. PULLINGER.

UHLENHUTH, P., & TRAUTWEIN, K. (1934). Gibt es eine wechselseitige Immunität zwischen Maul- und Klauenseuche und Vakzine. [**Cross-Immunity between Foot and Mouth Disease and Cow Pox**].—*Z. ImmunForsch.* **84.** 98-110. 4 tables. [22 refs.]

It was found that 28 guinea pigs vaccinated with cow pox virus and then injected with foot and mouth disease virus strain A all developed foot and mouth disease lesions. Twenty-nine control guinea pigs, which received no cow pox vaccine, also all became infected. Using strain B of foot and mouth disease virus, eight out of 21 animals vaccinated against cow pox virus and one out of 21 controls became infected. With strain C, all of 19 similarly vaccinated animals became infected, as did 16 out of 19 controls. On the basis of these experiments it is concluded that no immunity against foot and mouth disease virus is conferred upon guinea pigs by vaccination with cow pox virus.—E. J. PULLINGER.

MICHALKA, J. (1935). Die Ergebnisse der Schweinepestbekämpfung durch Simultanimpfungen mit erhöhten Serumdosen in Oesterreich in den

Jahren 1931 bis 1934. [**Vaccination against Swine Fever in Austria from 1931 to 1934 with Virus and with Large Doses of Serum**].—*Wien. tierärztl. Mschr.* **22.** 449-457. 3 tables.

Not satisfied with the results of previous experiments in simultaneous vaccination, the author decided on further experiments using increased doses of serum. Two sets of laboratory experiments were carried out, the first with 14 store pigs, the second with five breeding sows. The doses of serum were as follows :–

Sucking pigs	20 c.c.
Weaned pigs	
20 kg. body weight	40 c.c.
30 kg. ,, ,,	50 c.c.
40 kg. ,, ,,	60 c.c.
50 kg. ,, ,,	70 c.c.
up to a maximum of	150 c.c.

The doses of virus were 1 c.c. for pigs up to 80 kg., and 2 c.c. for any over that weight. The results were entirely satisfactory and large-scale experiments were carried out on 25,504 pigs in the period from 1st April, 1931, to the end of 1934. Some of these pigs belonged to uninfected herds, some to acutely infected herds and some were sows in varying stages of pregnancy.

The author believes that increased doses of serum do not mask the desirable clinical reaction. The possibility of virus carriers or excretors is slight. He does not claim that swine fever can be stamped out by means of serum-simultaneous vaccination, but he believes that its use can render breeding more economic.

—M. Burke.

Schwarte, L. H. (1935). **The Migration of Hog Cholera Virus when Subjected to Electrophoresis.**—*J. Amer. vet. med. Ass.* **87.** 177-182. 2 tables. [15 refs.]

Virulent swine fever serum, filtered to eliminate all chance of bacterial contamination, was diluted in the proportion of 25 c.c. of serum to 75 c.c. of saline solution. Various mixtures were made up with pH values of 5·0, 6·0, 7·0, 8·0 and 9·0 respectively and were then exposed to a current flow of 20 milliampères for three hours, in an apparatus similar to that described by Todd [(1927). *Brit. J. exp. Path.* **7.** 369]. The liquids from the two chambers (positive pole and negative pole) were injected into susceptible pigs.

The results showed that, over the whole range, the virus migrated to the positive pole. Since the associated proteins also migrated in the same direction, it is suggested that they transplanted the virus to the anode or, alternatively, that the virus carries a negative electric charge.—R. E. Glover.

I. Balozet, L. (1935). Action de certains agents chimiques : éther, chloroforme, fluorure de sodium, phénol, saponine, sur le virus de l'anémie infectieuse. [**The Action of Certain Chemicals on the Virus of Equine Infectious Anaemia**].—*C. R. Soc. Biol. Paris.* **119.** 162-165. [8 refs.]

II. Balozet, L. (1935). Action de la glycérine sur le sérum virulent dans l'anémie infectieuse. [**The Action of Glycerin on the Virus of Equine Infectious Anaemia**].—*Ibid.* 282-283. [1 ref.]

III. Balozet, L. (1935). Action de la bile sur le virus de l'anémie infectieuse des équidés. [**Action of Bile on the Virus of Equine Infectious Anaemia**].—*Ibid.* 818-820. [2 refs.]

I. This paper records experiments on the artificial attenuation of the virus of equine infectious anaemia by means of certain chemicals. The following are the agents tested and the results obtained in their use :– sulphuric ether – without

action on the virus ; chloroform – failure to bring about destruction of the virus but some degree of attenuation effected ; sodium fluoride – without action ; phenol – feebly destructive, and saponin – complete destruction within 24 hours, the resulting vaccine, however, being devoid of antigenic properties. A record of the inoculation experiments carried out with each drug is included in the paper.

II. In continuation of the foregoing experiments the author tested the effect of glycerin on the virus of equine infectious anaemia. He found that when submitted to the action of glycerin for four months virulence was considerably reduced. Seven months' contact brought about destruction. He concludes that glycerin attacks the virus in a slowly progressive manner and that it may be possible to make use of this fact for inducing a mild attack of the disease in inoculated animals and thereby setting up a state of " premunition ".

III. In continuation of his search for a means of attenuation of the virus of equine infectious anaemia, the author experimented with the use of bile. Various dilutions from 1 : 2 to 1 : 30 parts of bile to virulent serum were employed, donkeys again being used for the experiments. The results of each of the 18 test inoculations are given. The author suggests that, though inconclusive, they present a base for further research on similar lines.—C. Davenport.

Balozet, L. (1935). Études expérimentales sur l'anémie infectieuse des équidés. (II) Action de la bile sur le virus. [**Experimental Studies of Equine Infectious Anaemia. II. Action of Bile on the Virus**].—*Arch. Inst. Pasteur Tunis.* **24.** 493-507. 3 figs., 1 table. [3 refs.] [For abst. of previous article of this series, see this *Bull.* **5.** 810].

This paper is a further study of the problem of immunization against equine infectious anaemia. It opens with a discourse on the aim of the immunologist in relation to this disease. The author points out that, as an attack of the disease confers no immunity, it would appear to be a waste of time to explore the use of a killed virus as a means of obtaining artificially what is not forthcoming naturally. The nature of the resistance to reinfection shown by animals which survive an attack of the disease is analogous to that seen in certain of the bacterial and protozoan infections and is due to the persistence of a mild latent infection which is tolerated without any sign of ill health. In this and certain other respects the virus of equine infectious anaemia is unique among the filtrable viruses except for its counterpart, infectious anaemia of sheep and goats. Such a form of protection the author terms " immunity-tolerance ", " immunity of infection " or " premunition ". The solution of the problem of protective inoculation in equine infectious anaemia should thus be sought in the direction of finding a means of conferring a mild attack of the disease through the employment of a virus sufficiently weak to confer a benign chronic infection, but strong enough to resist complete elimination from the body. Such would appear to involve the use of an attenuated virus.

The remainder of the paper is a detailed account of a series of experiments on the use of bile as an attenuating agent. When mixed for 24 to 48 hours with an equal part of virulent serum, bile was found to neutralize the virus completely in half of the experiments. In lower dilutions than this, viz. 1 : 3 to 1 : 10, the activity of the virus was reduced in most cases. The results obtained in these dilutions were too irregular to permit definite conclusions to be drawn, although in some of the experiments a serviceable degree of protection was forthcoming. In a dilution of 1 of bile to 30 of virulent serum no degree of attenuation was detectable.—C. Davenport.

Svanberg, O. (1934). Om de lantbrukskemiska förutsättningarna för uppkom-

sten av lokalbundna anämisjukdomar i Norrland. **[Soil and Vegetation in Relation to the Local Occurrence of Anaemic Conditions in Northern Sweden. A Preliminary Report].**—*Lant.-Högskol. Ann.* **1.** 209-250. 9 tables. [22 refs.] [English summary : abst. from orig.]

This is the first communication of a committee investigating the anaemias of horses of general occurrence in Sweden, especially in Norrland. [This concerns equine infectious anaemia, but the author assumes that there are other types in Sweden]. He presupposes that the chemical composition of the soil, and therefore of the crops, in the localities where equine infectious anaemia occurs may exercise a predisposing influence.

Twenty-one samples of hay originating from affected pastures were analysed, and the conclusion was drawn that the amount of total nitrogen (crude protein), silicic acid, lime, phosphoric acid, potassium, magnesium and sulphur was of no importance in connexion with the disease. Unusually low percentages of chlorine and sodium were found (0·221 per cent. Cl, 0·019 per cent. Na_2O in the air-dried samples from pastures). Small amounts of aluminium, iron and copper were found, but manganese was present in exceptionally high amounts, especially in those samples originating from localities where severe cases of anaemia occurred. The correspondence of manganese content to the occurrence of anaemia localities is striking. The mean content of MnO was 0·208 per thousand, varying from 0·044 to 0·906. Samples from localities free from disease varied from 0·022 to 0·058. It is reasonable to believe that the normal content of MnO in hay is 0·02 to 0·1 per thousand.

The author points out that more extensive work including experiments on animals is necessary before any general theory can be advanced.

—H. C. Bendixen (Copenhagen).

Ludewig, J. (1935). Beitrag zum Verhalten der Gitterfasern des Pferdes unter spezieller Berücksichtigung der infektiösen Anämie. **[Behaviour of Reticular Connective Tissue Fibres of the Horse with Special Reference to Infectious Anaemia].**—*Inaug. Diss. Hanover.* pp. 56. [30 refs.]

Proliferation of reticular fibrils throughout most of the organs of the body is characteristic of equine infectious anaemia, and where such proliferation is encountered it can be considered highly indicative, though not absolutely diagnostic, of this disease. In other conditions in which similar proliferation is encountered, it is generally confined to one or more organs but is not so widespread throughout the whole body.—E. J. Pullinger.

Schmidt, F. W. (1935). Postmortale Schnelldiagnose der Infektiösen Anämie der Pferde. **[Rapid *Post-mortem* Diagnosis of Equine Infectious Anaemia].** —*Münch. tierärztl. Wschr.* **86.** 385-387. 1 table. [1 ref.]

The technique described by Zanaty [(1935). *Virchows Arch.* **293.** 335.], for studying the histology of blood diseases by means of impression preparations, has been applied to the diagnosis of infectious anaemia. Sections were cut and smears prepared from material from 22 horses suspected of having died of equine infectious anaemia. Giemsa stain was used on preparations for the study of cytological changes and Berliner blue for evidence of deposition of iron. Out of 22 cases, 13 proved to be positive, 7 negative and 2 doubtful. In every case in which smears and sections could be compared the results were in agreement. A positive diagnosis was only made when haemosiderosis and round-cell infiltration were clearly demonstrable in the liver, spleen and kidney or in at least two of them.

The author concludes that smear examination provides a reliable, simple and rapid method of examination for this disease.—E. J. PULLINGER.

BALOZET, L. (1935). Effet de réinoculations, chez l'âne, du virus de l'anémie infectieuse. **[The Effect of Reinoculation of the Virus of Equine Infectious Anaemia in the Donkey].**—*C. R. Soc. Biol. Paris.* **119.** 160-162. [5 refs.]

Eleven donkeys, which had recovered from an attack of equine infectious anaemia resulting from experimental inoculation of virus, were reinoculated with the same or a different strain of the virus. One of them reacted mildly and three developed a severe reaction which terminated fatally.

As it has never been possible to reproduce the disease in a horse which has suffered and recovered from an attack of the disease, the author is at a loss to explain why these positive results have attended his work in the donkey.—C. D.

SHAHAN, M. S., & GILTNER, L. T. (1935). **Experimental Studies on Equine Encephalomyelitis Formalized Brain Tissue Vaccine.**—*N. Amer. Vet.* **16.** No. 6. 18-26. 5 tables. [4 refs.]

The authors inoculated over 400 horses under experimental and field conditions to determine the prophylactic value of vaccine prepared against [eastern U.S.A. type of] encephalomyelitis. This consisted of a 10 per cent. suspension of brain tissue in saline—the brains having been taken from horses *in extremis* or at death following intracerebral inoculation of encephalomyelitis virus. The suspension was inactivated by the addition of 0·4 per cent. formalin. Two doses of 25 c.c. each were inoculated subcutaneously, with an interval of 12 to 14 days.

Nine out of 13 vaccinated horses were sufficiently protected to withstand an intralingual inoculation of virus sufficiently active to cause the development of encephalomyelitis in 13 control animals. Other experiments showed that vaccine retained its antigenic value for some months. In field trials, vaccination did not confer 100 per cent. immunity to natural infection, but the data collected showed a higher incidence of the disease in the non-vaccinated animals. The results of the tests were encouraging and warrant further trials with vaccination prior to the season when the disease occurs.—D. R. WILSON.

COVELL, W. P. (1934). **Intranuclear Inclusions in Brain of Chick Embryo after Inoculation of Eggs with Virus of Equine Encephalomyelitis.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 51-53. [3 refs.]

Chick embryos (after ten to 12 days' incubation) inoculated with two strains of the virus of equine encephalomyelitis showed diffuse inflammatory changes in the chorio-allantoic membrane after a few hours, without formation of inclusion bodies. The nuclei of the nerve cells of the various regions of the brain were found to contain one, sometimes two, acidophile inclusions, varying in size from tiny bodies to bodies of one-fourth to one-third of the size of the nucleus. Necrotic nerve cells were also present.

No inclusion bodies occurred in the nerve cells of chick embryos inoculated with the viruses of Borna disease and poliomyelitis.—A. BROWNLEE.

I. HOWITT, Beatrice F. (1935). **An Immunological Study in Laboratory Animals of Thirteen Different Strains of Equine Encephalomyelitis Virus.**—*J. Immunol.* **29.** 319-341. 4 tables. [21 refs.].

II. HOWITT, Beatrice F. (1935). **An Immunological Study in Laboratory Animals of Thirteen Strains of Equine Encephalomyelitic Virus.**—*J. Bact.* **29.** 61.

Eleven strains of equine encephalomyelitis obtained from different parts of

the United States of America could be divided into eastern and western groups. An Argentine strain was shown to belong to the western group, while a strain from Russia differed from both.

Each group was immunologically distinct when tested by *in vitro* neutralization tests and by *in vivo* protection tests, but a percentage of guinea pigs immunized against either the eastern or the western strain showed cross-immunity. There was no cross-immunity between the Russian strain and the two American strains.

II. An abridged version of I.—A. BROWNLEE.

KUTEJ, E. (1935). Pokus o profylaxi a theràpii inf. chorob vepřového dobytka, spec. Těsinské choroby. [**Experiments on the Prophylaxis and Treatment of Infectious Diseases of Pigs, Particularly Teschin Disease (Encephalomyelitis enzootica suum)**].—*Zverolék. Obz.* **28.** 97-101. [4 refs.] [German summary : abst. from orig.]

In the therapy of swine erysipelas encouraging results were obtained by using an immune serum mixed with an emulsion of colloidal magnesium hydroxide (" polysan "). In an attempt to find a useful therapeutic agent for cases of Teschin disease, the author used bromine salts, potassium iodide, arsenic and normal horse and bovine blood serum without any effect. Good results were obtained when " polysan " was used. The author injected 71 infected pigs subcutaneously with 1 c.c. of the emulsion per kg. body weight : 29 pigs recovered and 42 died. The mortality of untreated pigs affected with Teschin disease is almost 100 per cent. Preventive inoculation with the emulsion also had a very good effect.

A theory of the mode of action of " polysan " is given.—E. PRIBYL (BRNO).

GREEN, R. G., ZIEGLER, N. R., GREEN, R. B., SHILLINGER, J. E., DEWEY, E. T., & CARLSON, W. E. (1935). **Epizootic Fox Encephalitis. VII. Nature of the Immunity.**—*Amer. J. Hyg.* **21.** 366-388. 1 fig., 2 tables. [9 refs.] [For abst. of previous articles of this series, see this *Bull.* **5.** 720].

Foxes which had recovered from a natural or artificial attack of specific encephalitis showed neutralizing antibodies in their sera. The value of these sera was considerably enhanced by hyperimmunization and highly potent products were secured in foxes which had received graded doses of virus over periods up to two years. Sera prepared in dogs were of lower value than fox sera, but were still capable of affording some degree of protection. No antibodies were demonstrated in non-susceptible species such as the sheep and the monkey, even after intensive courses of hyperimmunization.

In serum-virus experiments in the fox, numerous examples of delayed death were encountered. In some of these animals, it was shown that living virus was still present in the body after a lapse of four to five weeks. It is suggested that in these instances there was an individual lack of response to the immunizing process and, when the passive protection afforded by the original dose of serum had disappeared, the animals succumbed to the action of the virus. In such cases, a second dose of serum given two or three weeks after the simultaneous injection generally protected the animals during the critical period. A solid immunity was then established in most instances, but about 8 per cent. reacted when exposed to an experimental infection six months later.—R. E. GLOVER.

GALLOWAY, I. A., & PERDRAU, J. R. (1935). **Louping-Ill in Monkeys. Infection by the Nose.**—*J. Hyg., Camb.* **35.** 339-346. 1 plate, 2 tables. [13 refs.]

A few drops of a broth filtrate prepared from a 10 per cent. suspension of

" louping ill "-infected mouse brains were allowed to fall on to the nasal mucosa of each nostril of 14 monkeys under light anaesthesia. This was, in most cases, repeated in 48 hours, though this second inoculation would not appear necessary. Twelve out of the 14 monkeys became infected and showed symptoms of a cerebellar ataxia. The average period between the first inoculation and the onset of nervous symptoms was 17 days. The presence of virus in the various tissues was detected by intracerebral inoculation of mice. Virus was detected in the blood of one monkey only. This was on the fifth day after the first of two inoculations. (In contrast to this, virus was found in the blood of two monkeys inoculated intracerebrally after an interval of two to four days). In this animal, which was destroyed on the fifth day, virus was also present in the spleen, liver, kidney, lung and mesenteric gland ; but in none of the other monkeys were such organs found to contain virus. Another monkey killed on the fifth day showed no virus in any of its organs. In one of two monkeys, killed on the eighth day, no virus was detected in any of the tissues and, in the other, virus was detected only in the olfactory lobe and in the tempero-sphenoidal lobe. Two monkeys killed on the 12th day and those destroyed after showing symptoms contained virus almost throughout the brain and also, in the case of those killed late in the course of the disease, in the spinal cord.—A. Brownlee.

Shope, R. E. (1935). **Experiments on the Epidemiology of Pseudorabies. I. Mode of Transmission of the Disease in Swine and Their Possible Rôle in Its Spread to Cattle. II. Prevalence of the Disease among Middle West Swine and the Possible Rôle of Rats in Herd-to-Herd Infections.**—*J. exp. Med.* **62.** 85-99 and 101-117. 8 tables. [25 refs.]

Since the method of transmission of the virus of Aujeszky's disease to cattle is at present unknown, the origin of field outbreaks is often obscure. Experiments in pigs have suggested, however, that this species may act as the reservoir of the virus. Swine may be infected by the subcutaneous, the intramuscular or the intranasal routes, but the type of disease which is induced is essentially mild in character, i.e. a febrile response of from one to eight days' duration and a transient depression. Nevertheless, the condition is moderately contagious, more particularly during the terminal stages.

Experiments on transmission showed that lice played no part ; moreover, the virus was not demonstrated in the urine, the faeces or the salivary secretion. The application of the nasal secretions to the abraded skin of rabbits readily induced the disease, however, and it is suggested that under farm conditions, in which pigs are kept in intimate contact with cattle, the latter become infected by the dermal route from the nasal secretions of pigs suffering from a mild and unrecognized form of the disease. On two farms where cattle had died of Aujeszky's disease, the sera of some of the pigs contained neutralizing antibodies.

This observation suggested that an examination of sera from pigs in the Middle West areas might throw some light on the prevalence of the disease. Bulked samples of pig sera in doses of 1 c.c. and 0·1 c.c. were, therefore, added to a fixed amount of virulent rabbit brain (100 to 1,000 M.L.D.) and the mixtures were inoculated subcutaneously into guinea pigs. Neutralizing antibodies were found not only in 23 out of 25 samples from the Middle West, but also in 21 out of 23 commercial anti-swine fever sera. The latter result was not due to some form of cross-immunity since susceptible pigs, immunized at the laboratory against swine fever, reacted to the virus of Aujeszky's disease. It is suggested that the pigs passing through the biological farms had acquired Aujeszky's disease in a mild form at an earlier period.

Brown rats were infected by the alimentary tract and in turn set up the disease when their carcasses were fed to pigs. Rats may, therefore, be of importance by acting as the original source of an outbreak and by spreading infection from farm to farm.—R. E. GLOVER.

REMLINGER, P., & BAILLY, J. (1935). Association de la pneumonie et de la rage chez le chien. [**Association of Pneumonia and Rabies in the Dog**].—*Maroc méd.* Aug. 15th. 305-306. [2 refs.]

The writers draw attention to the association of pneumonia with rabies. Two cases are described where pneumonia was the cause of death in dogs which subsequently were proved to be infected with rabies, but without any previous history of the disease. Smears from the brain failed to demonstrate the presence of inclusion bodies, but inoculation of brain emulsion produced rabies. As virus has been demonstrated in the lungs of infected animals, it is suggested that there may exist a pneumonic form as well as an intestinal form.

The authors emphasize the danger of infection in human subjects performing an autopsy on such animals unsuspected of rabies, but suffering from pneumonic symptoms.—G. NORMAN HALL.

ANDO, K. (1935). Untersuchungen über Virus-fixe der Lyssa. I. Virulenz des Virus-fixe und seine Klassifikation. II. Vergleichende Immunisierungsversuche mit Virus-fixe-Stämmen. III. Ueber Virus-fixe-Stämme und ihre Auswahl. [**Research on Rabies Fixed Virus. I. Virulence. II. Immunization. III. Selection of Strain of Fixed Virus**].—*Jap. J. exp. Med.* **13.** 125-147, 149-157 and 159-165. 9 figs., 28 tables. [78 refs.] [In German].

Fixed strains of virus, produced from street virus by animal passage, have been studied. Intracerebral injection of strains of fixed virus showed that the length of the incubation period and duration of illness produced varied from strain to strain, though with any one strain the duration of these periods remained constant even when different doses of virus were administered. Subcutaneous or intraplantar injection of decreasing doses of particular strains of fixed virus revealed a weakening of virulence, as judged by a lengthening of these periods, whilst other strains did not show this feature. The ability of a strain of virus to stimulate the formation of Negri bodies, when once acquired, was not easily lost again.

Vaccines produced from strains of virus having a short incubation period stimulate the production of antibodies more rapidly than those having a long incubation period, though the ultimate titre of antibodies attained is the same. For this reason a strain having a short incubation period is desirable for a vaccine to be used in individuals already bitten where the time factor is of immense importance. In choosing a strain for a prophylactic vaccine, the speed of antibody production is unimportant compared with the degree of immunity produced.
—E. J. PULLINGER.

WEBSTER, L. T., & DAWSON, J. R., Jr. (1935). **Early Diagnosis of Rabies by Mouse Inoculation. Measurement of Humoral Immunity to Rabies by Mouse Protection Test.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 570-573. 1 table. [2 refs.]

An early reliable diagnosis of rabies and a protection test for measuring humoral immunity to the virus may become feasible by the use of highly susceptible strains of mice. In the past mice have proved unsatisfactory as test animals, but those bred for high susceptibility to neurotropic viruses are more sensitive and uniform in their response to the rabies street virus.

The tests already carried out suggest that, by the intracerebral and intraperitoneal injection of special mice, rabies may be diagnosed within seven days, whereas ordinarily the injection of brain tissue from rabid animals into rabbits or guinea pigs incites the disease irregularly and in such cases the incubation period is two to eight weeks.

A mouse protection test for the quantitative measurement of protective antibodies against rabies virus is being developed, and a table is furnished showing the protective effect against rabies virus of serum from an individual receiving Semple antirabic treatment.—J. M. L. PENHALE.

HALASZ, F. (1934). Szarvasmarhaveszettség gyógyult esete. [**Recovery from Rabies in a Dog**].—*Allatorv. Lapok.* **57.** 15-16. 1 table. [Abst. from abst. in *Rev. gén. Méd. vét.* **44.** 213].

An account of the diagnosis of rabies in a young dog by intramuscular or subdural inoculation of saliva into rabbits which died within 17 to 32 days.

Symptoms in the dog were pronounced for five days and remained stationary during the following three days. By the 18th day all symptoms of paralysis had disappeared and the appetite was regained. Eight days after recovery, the saliva was still infective for the rabbit.

KONDO, S. (1934). **Rabies and its Control in Japan.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 3055-3060. 5 tables.

The prophylactic vaccination of the dog against rabies has proved a most practical and effective measure for controlling the disease in Japan. The method was introduced in 1918 and has since been made compulsory in nearly all parts of the country. Apart from the years 1923 to 1925 when, on account of the great earthquake, control measures could not be enforced, the annual number of cases has declined from 1,041 in 1918 to 60 in 1930; the latter occurred chiefly in unvaccinated dogs. Of 1,699,518 dogs vaccinated, only 301 (0·018 per cent.) contracted the disease.

Vaccination consists of a single subcutaneous injection (5 c.c.) of a 1 : 6 fixed virus suspension in phenol-glycerin water (50 per cent. glycerin and 0·5 per cent. phenol) which has been attenuated by heat at 37°C. for 72 hours. The degree of attenuation is such that rabbits and guinea pigs succumb to intracranial injection, but that it is harmless for dogs when given subcutaneously.—G. O. D.

MANOUÉLIAN, Y. (1935). Altérations massives du réseau neurofibrillaire dans la rage. Dégénérescence neurohyaline des cellules nerveuses des ganglions cérébro-spinaux. [**Alterations in the Nervous System in Rabies. Neurohyalin Degeneration in the Nerve Cells of the Cerebrospinal Ganglia**].—*C. R. Soc. Biol. Paris.* **119.** 1021-1023. 4 figs. [7 refs.]

Normal nerve cells contain a frame-work of fibrils which form a very complex net-work in the cytoplasm of the cells. This net-work shows great variation especially in rabies. In rabbits infected with the fixed virus, the neurofibrils coalesce and form a homogeneous mass resembling the collagen fibres seen in hyalin degeneration. If recovery takes place, a process of repair occurs in the nerve cells and their appearance becomes normal. If, however, the disease is fatal, the neurone atrophies and finally disappears.—J. A. NICHOLSON.

SLANETZ, C. A. (1935). **Insusceptibility of Young Puppies to Distemper Virus.** —*Proc. Soc. exp. Biol., N.Y.* **32.** 1227-1229. [2 refs.]

From his experiments the author concludes that the intradermal inoculation

of young puppies with living distemper virus within a month of birth does not give rise to distemper. He also states that despite the absence of disease symptoms the injections appear to confer a permanent immunity. [Some of the experimental results appear to be contradictory and the conclusions drawn are open to question].
—GWILYM O. DAVIES.

BEARD, J. W. (1935). **Conditions Determining Melanosis of a Virus-Induced Rabbit Papilloma (Shope).**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1334-1336. [4 refs.]

"The pigmentation of Shope papillomas is not determined by the strain of virus inducing the growths, but by the epidermis upon which it acts." The author has supported this statement by showing that, whether the virus used is of pigmented origin or otherwise, pigmentation will only occur in the new growth if the inoculation is made into a tissue where melanoblasts or potential melanoblasts are already present.—NORMAN HOLE.

BRANDLY, C. A. (1935). **Some Studies of Infectious Laryngotracheitis. The Continued Propagation of the Virus upon the Chorio-Allantoic Membrane of the Hen's Egg.**—*J. infect. Dis.* **57.** 201-206. 3 figs., 1 table. [4 refs.]

This article records the maintenance of the virus of infectious laryngotracheitis through 25 passages through eggs. For egg to egg passage of the virus, typically affected chorio-allantoic membranes were removed aseptically, triturated in Hagan grinding tubes, and a broth suspension made for further inoculation of eggs. A circular disc, consisting of the shell and outer shell membrane, was removed over the air sac, the chorio-allantoic membrane inoculated, and the hole reclosed with cellophane applied with library tape. Considerable variation in the appearance and extent of the infective process in the chorio-allantoic membrane was noticed, the typical lesions being opaque plaques associated with oedema. All eggs showing typical gross lesions of the chorio-allantoic membrane failed to hatch, the embryo dying within two to 12 days of inoculation. Virus cultivated in eggs was tested for immunizing quality by cloacal vaccination and proved satisfactory.—U. F. R.

BEACH, J. R. (1935). **The Survival of the Virus of Infectious Laryngotracheitis in the Bursa of Fabricius and Cloaca of Chickens after "Intrabursal" Injection.**—*J. infect. Dis.* **57.** 133-135. 2 tables. [4 refs.]

This article records investigations undertaken to ascertain how long the virus of infectious laryngotracheitis survives in the bursa of Fabricius and the cloaca of chickens vaccinated by the application of virus to the mucous membranes of those organs. The virus could not be detected in the organs after the seventh day by the intratracheal injection of scrapings into susceptible birds. This time interval corresponded with the visible inflammatory reaction of the cloacal mucous membrane to the virus.—U. F. RICHARDSON.

ROBERTSON, W. A. N. (1934). **Psittacosis or Parrot Fever.**—*Aust. vet. J.* **10.** 217-219.

The first indication of the presence of psittacosis in Australia was the finding of the disease in birds from that country shortly after their arrival in the United States of America and England. Attention is drawn to the recent demonstration of the disease in Australian parrots by BURNETT [see this *Bull.* **5.** 814]. Although no cases of human infection have been reported, the possibility of the virus undergoing an increase in virulence must not be overlooked, and it is requested that any suspicious sickness in man or birds be reported.—W. I. B. BEVERIDGE.

MEYER, K. F., EDDIE, B., & FOSTER, L. (1935). **Cytology of Psittacosis Virus in the Sparrow (Zonotrichia).**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1656-1658. [5 refs.]

Many white-crowned (*Z. leucophyrs gambeli*) and golden-crowned (*Z. coronata*) sparrows which had been injected intraperitoneally with psittacosis virus died in from eight to 12 days and revealed at autopsy a diffuse plastic exudate on the pericardium and abdominal viscera.

Preparations of this exudate, which was full of free and intracellular Levinthal-Cole-Lillie bodies, enabled the authors to trace the intracellular development of the virus. In the monocytes, oval, circular or comma-shaped bodies were evident and these developed into elementary bodies which were finally liberated into the exudate.—GWILYM O. DAVIES.

GREENE, H. S. N. (1935). **Rabbit Pox. III. Report of an Epidemic with Especial Reference to Epidemiological Factors.**—*J. exp. Med.* **61.** 807-831. 4 text figs., 4 tables. [5 refs.] [For abst. of previous articles of this series, see this *Bull.* **5.** 77].

In this report the author discusses the epidemiological aspects of an outbreak of pox in a colony of rabbits. The main points he deals with concern the composition of the population, the housing and care of the colony, and the health and efficiency of the population, with data on reproductive activity and the incidence of disease (snuffles, gastro-intestinal disorders and the death rate from various causes).

Observations include those made in the pre-epidemic period in addition to those made throughout the different periods of the epidemic. It appears that the epidemic originated among animals which had been inoculated with vaccine virus, and that the infection was carried to the breeding colony by caretakers. Atypical cases of visceral disease were followed by typical cases of pox and the epidemic terminated with cases of mild cutaneous disease. The epidemic of pox was the terminal event in a series of progressive disorders which began fully a month before the first case of pox occurred. The decrease in severity of the disease and the termination of the epidemic appeared to be attributable to an improvement in the condition of the population and not to a specific immunity acquired by exposure to infection.—D. R. WILSON.

BAUMGARTNER, Gertrud. (1935). Infektionsversuche mit isolierten Einschlusskörperchen der Hühnerpocken und der Ektromelie. [**Infection Trials with Isolated Inclusion Bodies of Fowl Pox and Ectromelia**].—*Zlb. Bakt. I. (Orig.).* **133.** 282-289. [4 refs.]

By special methods the inclusion bodies of fowl pox and of infectious ectromelia have been isolated from the tissues, washed, and inoculated singly, the fowl pox into the feather follicles of chickens, and the ectromelia into mice. The technique is intimately described, and an account given of each experimental disease. Both single inclusion bodies and the washing solution were tested, and the results fall into four categories. Group I includes experiments in which only the inclusion bodies proved infectious (46 per cent. of fowl pox and 42 per cent. of ectromelia inoculations). In group II the washings alone proved infectious (3 per cent. of fowl pox and 4 per cent. of ectromelia). In group III both inclusions and washings proved infectious (20 per cent. of fowl pox and 42 per cent. of ectromelia). In group IV both inclusions and washings were negative (31 per cent. of fowl pox and 11 per cent. of ectromelia). The author does not assert that failures are all ascribable to inoculation accidents. The amount of virus present in

inclusions is uncertain, the clinical symptoms being an unreliable means of assessing the amount of virus inoculated.—NORMAN HOLE.

WALDMANN, O. (1935). Pneumotrope Virusarten. **[Pneumotropic Viruses].**—*Dtsch. med. Wschr.* **61.** 8-10. [6 refs.]

It is suggested that, just as certain groups of viruses find their predilection site in nervous tissue (neurotropic) and others in skin (dermatotropic), yet another group finds its normal situation in the lungs (pneumotropic). This group would include the viruses of swine influenza (SHOPE), piglet influenza (KÖBE), contagious equine bronchitis (Hoppegarten cough) (WALDMANN, KÖBE and PAPE), human influenza and possibly others.—E. J. PULLINGER.

TRAUB, E. (1935). **A Filterable Virus Recovered from White Mice.**—*Science.* **81.** 298-299. [3 refs.]

While experimenting with the viruses of swine fever and equine encephalomyelitis, an infective agent distinct from both of these made its appearance in the experimental mice. A small percentage of mice inoculated with sterile bouillon were also found to develop the disease. Guinea pigs are very susceptible to this virus when inoculated intracerebrally or subcutaneously. The agent passes through Berkefeld N and W filters and remains alive in 50 per cent. glycerol for at least a month. The virus is distinct from the virus of ectromelia and from that of spontaneous encephalitis of mice described by Max THEILER.—A. BROWNLEE.

WHITMAN, L. (1935). **The Response to Yellow Fever Virus in the Nonsusceptible Rabbit.**—*J. Immunol.* **29.** 99-110. 8 tables. [7 refs.]

The author points out that one of the fundamental questions in the field of virus diseases is whether actual infection is necessary to produce immunity. This is a study of the fate of the virus when introduced into the rabbit, an animal which is resistant to infection. Evidence seems to indicate that any virus introduced is rapidly destroyed, yet a relatively high level of antibodies, capable of conferring passive immunity, appears in the circulation. This level can be raised by another injection six weeks later or more. Hitherto it has been considered impossible to hyperimmunize animals to the yellow fever virus.—GWILYM O. DAVIES.

COWDRY, E. V., & SCOTT, G. H. (1935). **Nuclear Inclusions Suggestive of Virus Action in the Salivary Glands of the Monkey,** *Cebus fatuellus.*—*Amer. J. Path.* **11.** 647-657. 6 figs. on 1 plate, 2 tables. [Numerous refs.]

COWDRY, E. V., & SCOTT, G. H. (1935). **Nuclear Inclusions in the Kidneys of** *Macacus rhesus* **Monkeys.**—*Ibid.* 659-668. 12 figs. on 2 plates, 3 tables. [19 refs.]

An examination of the tissues from two monkeys (*C. fatuellus*), used for an experiment with irradiated ergosterol, showed large intranuclear acidophilic bodies resembling the inclusions described in the submaxillary glands of the guinea pig. They were found in the submaxillary and parotid glands, but only a very small percentage of the cells were infected. Cytoplasmic inclusions were also observed in a proportion of the cells containing nuclear bodies.

On the other hand, in a series of *M. rhesus* monkeys also treated with irradiated ergosterol, no salivary gland inclusions were found but, in 75 per cent. of the animals, bodies of a similar morphological appearance were noted in the kidney. Instead of being rare and exhibiting uniform properties like those of the salivary gland virus, they occurred in large numbers and were very variable in size. They

were found in one out of ten normal monkeys, and in 18 out of 107 used for other experiments.

It is suggested that the administration of irradiated ergosterol activated a virus which was latent in the kidney, but its presence was not proved in either series by transmission to young susceptible monkeys.—R. E. GLOVER.

LE MAR, J. D., & MYERS, J. T. (1935). **Studies on the Nature of Bacteriophage. I. Extraction of Bacteriophage by Ether. II. The Artificial Production of a Specific Lytic Agent which Seems to Behave like Bacteriophage.**—*J. infect. Dis.* **57.** 1-5 and 6-11. 1 fig., 6 tables, 1 chart. [6 refs.]

I. In investigating the nature of bacteriophage a study was made of its solubility. Bacteriophage was found to be soluble in ether and it could be extracted completely from aqueous solution by ether without being harmed. For complete extraction, agitation is necessary for a prolonged period of time.

II. In an attempt to produce an artificial bacteriophage, cultures of *Bact. coli*, *Salmonella typhi*, *S. cholerae-suis* and *Staphylococcus aureus* were grown in broth for 48 hours, autoclaved for 20 minutes, reincubated at 37°C. and then oxidized for 48 hours at 37°C. with 3 per cent. H_2O_2. In this manner lytic filtrates were produced. The lytic factor was filtrable, transmissible in series, produced plaques and in general closely resembled bacteriophage.—E. J. PULLINGER.

BASSET, J., WOLLMAN, E., WOLLMAN, Elizabeth, & MACHEBOEUF, M. A. (1935). Etudes sur les effets biologiques des ultra-pressions ; action des pressions très élevées sur les bactériophages des spores et sur les autolysines. **[The Biological Effects of High Pressures : Action of very High Pressures on Bacteriophages, Spores and Autolysins].**—*C. R. Acad. Sci., Paris.* **200.** 1072-1074. [5 refs.]

It was shown that high pressures rendered bacteriophages inactive. The bacteriophage of staphylococci required a pressure of 2,000 to 3,000 atmospheres whilst that of *Bacillus subtilis* required 6,500 to 7,000 atmospheres before its action was destroyed. In exposing the spores of a culture of *B. megatherium*, and then the bacteriophage produced in broth by this bacillus, to high pressures it was discovered that, whilst the bacteriophage was rendered inert by a pressure of 6,500 to 7,000 atmospheres, the lysogenic function of the culture remained intact at 9,500 to 10,000 atmospheres and thus the authors concluded that the lysogenic function is protected against high pressures as it is against heat. It was found that the activity of autolysins was unimpaired by pressures up to 7,500 atmospheres. The specific autolysins showed no difference in character to the corresponding bacteriophages. The authors suggest that this might be of importance in determining the origin of bacteriophages.—JAMES STEWART.

INVERTEBRATE VECTORS OF DISEASE.

DE JESUS, Z. (1934). **The Life History of the Australian Cattle Tick under Philippine Conditions.**—*Philipp. J. anim. Indust.* **1.** 355-367. 1 text fig., 2 plates, 3 tables. [4 refs.]

de Jesus studied the life-history of *Boophilus australis* Fuller under Philippine conditions. He found that the life-cycle was completed in 48 to 50 days, 28 of which are spent on the ground. In spite of the two distinct seasons the life-cycle in the dry season was only one day shorter than in the wet season. The larval ticks swarmed on the top leaves of the grasses in from 26 to 29 days after the engorged

gravid females dropped to the ground, and unfed larvae remained viable for from 84 to 98 days.

In addition to cattle the carabao (water buffalo), horse and goat were capable of acting as hosts of this tick. Sheep could not be infested and the larvae did not attach themselves to the skin of dogs, though some remained in the coat for five days, showing that dogs may act as disseminators of the larval ticks. Nymphs fed readily on man though the larval ticks could not be induced to attach themselves to the human skin.—J. S. STEWARD.

I. MACLEOD, J. (1934). **The Part Played by Alternative Hosts in Maintaining the Tick Population of Hill Pastures.**—*J. Anim. Ecol.* **3.** 161-164. 1 graph. [2 refs.]

II. MACLEOD, J. (1935). *Ixodes ricinus* **in Relation to its Physical Environment. II. The Factors Governing Survival and Activity.**—*Parasitology.* **27.** 123-144. 8 figs., 1 table. [17 refs.]

I. MacLeod has previously shown that *I. ricinus* has numerous possible hosts other than sheep [see this *Bull.* **3.** 387]. In the present paper, he records that a tick population of an appreciable extent was maintained in a ten-acre field from which sheep were excluded for 18 months, and where the only available hosts were birds, hares and ground vermin such as field-mice, voles, weasels and stoats. It would appear, therefore, that removal of the chief host (sheep) for a number of years would not effect the eradication of the tick from an area.

II. In this paper MacLeod discusses the different physical factors in the environmental complex of active unfed ticks. These ticks have two desiderata, namely survival and host parasitization, hence it is necessary to consider not only the climatic optimum for survival and activity, but also the factors which influence parasitization.

It was found that this tick showed a remarkable resistance to unfavourable conditions, for instance, females were kept submerged in water for 21 days at about 15°C., and on being removed they walked away apparently unaffected. All stages of the tick were able to survive four days at a temperature of –8°C. though they were killed by one day at –15°C. Larvae which had been hatched for some time were able to survive lower temperatures and for longer periods than recently hatched larvae. With regard to the thermal death-point it was found that with increasingly high temperatures the influence of humidity in prolonging the survival period steadily diminished. In examining the climatic limits of survival, various combinations of temperatures and humidities were tested, and it was found that the most striking feature was the narrow range of humidity within which survival was possible. At unfavourable humidities (70 per cent. or lower) larvae survived longer at low temperatures than at high. Nymphs were found to be more tolerant of aridity than larvae. In brief, the survival limits embrace a wide range of temperature and only a narrow range of humidity.

Among the factors influencing the activity of the unfed ticks temperature is the most important. Changes in the moisture equilibrium of the air, within the narrow range tolerable, do not produce immediate responses but rather take effect through altering the water content of the body. Tick activity can be correlated with the atmospheric temperature, but there is no apparent relation between activity and rainfall. Experiments on the influence of temperature on activity showed that movement began at between 11° and 14°C. At 13°C. movement became general, and at 40°C. movement became excited and still more so at 45°C. At 47°C. there was a slowing down and raising the temperature to 51°C. resulted

in death. The preferred temperature range of the tick seems to lie between 14° and 23°C.

The influence of light was studied at different temperatures and humidities, and in all cases in both adults and nymphs a negative phototropic response was obtained. The larval ticks were found to be positively geotropic in darkness at temperatures below 12° and above 30°C. In daylight, the intensity of the response was greater, and the range of temperature was more clearly defined as 14° to 24°C.

The most remarkable requirement for survival of the unfed *I. ricinus* was found to be the high degree of humidity necessary. Saturated air had no adverse effect on vitality a markedly different result from that obtained with ticks of dry climates which are adversely affected by excess moisture. The lower limit of humidity for survival of *I. ricinus* throughout the limits of temperature normally occurring in Great Britain was found to be represented by a relative humidity value between 70 and 80.—J. S. STEWARD.

DUKE, H. L. (1935). **Studies on the Factors that may Influence the Transmission of the Polymorphic Trypanosomes by Tsetse. IX. On the Infectivity to *Glossina* of the Trypanosome in the Blood of the Mammal.** *Ann. trop. Med. Parasit.* **29.** 131-143. 5 tables. [5 refs.] [For abst. of previous articles of this series, see this *Bull.* **5.** 353].

This article discusses the influence of the " endogenous " development cycle of the polymorphic trypanosomes on their power of infecting tsetse fly. Experiments are recorded which suggest that the repetition of feeding on an infected animal during the positive phase of the cycle does not increase the infection rate in the flies. Evidence is also produced of the existence of " negative phases " during which the power of the trypanosome to infect glossinae is very low. —U. F. RICHARDSON.

METELKIN, A. I. (1935). **The Role of Flies in the Spread of Coccidiosis Among Animals and Men.**—*Med. Parasitol., Moscow.* **4.** 75-82. [9 refs.] [Abst. from abst. in *Rev. appl. Ent.* **23.** 164].

Experiments with various common flies (*Musca, Calliphora, Lucilia, Stomoxys, Cynomyia* and *Phormia*) showed that they were able to act as mechanical carriers of the oocysts of the coccidia of rabbits (*Eimeria irresidua* and *E. exigua*). They were also able to swallow these oocysts and to pass them out unchanged later.—J. E.

DISEASES CAUSED BY METAZOAN PARASITES.

ROBERTS, F. H. S. (1935). **A Check List of the Arthropod Parasites of Domesticated Animals in Queensland.**—*Aust. vet. J.* **11.** 2-10. [31 refs.]

This is an extensive systematic list of the arthropod parasites of domesticated animals and birds in Queensland, with brief notes on the economic importance of certain of these. *Psoroptes hippotis* is recorded from the horse for the first time in Australia. The importance of *Ixodes holocyclus* as the cause of fatal paralysis in sheep is mentioned. Another record of interest is the occurrence of fully gorged specimens of *Boophilus annulatus microplus* on the wallaby (*Macropus spp.*). The original paper should be consulted by those interested.—I. CLUNIES ROSS.

ROBERTS, F. H. S. (1934). **The Parasites of Poultry.**—*Qd agric. J.* **42.** 561-572. 16 figs.

This is a popular account of the ecto- and endo-parasites of poultry in Queens-

land. Notes are given on treatment and control of the more important of these. It is of interest to note that considerable importance is attached to heavy infestations with *Dispharynx spiralis* and *Cheilospirura hamulosa*. It may be noted that *Oxyspirura parvovum* is confined to tropical areas of Queensland, being unknown south of the 20 parallel.—I. CLUNIES ROSS.

I. MACDOUGALL, R. S. (1934). **Ox Warble Flies.**—*Trans. Highl. agric. Soc. Scot.* **46.** 1-90. 32 figs., 3 tables. [43 refs.]
II. —. (1935). **The Warble-Fly Campaign in Scotland.**—*Vet. Rec.* **15.** 315-319. 1 fig.
III. —. (1935). **The Warble-Fly Question.**—*Ibid.* 320.

I. Reference is made to the workers who have contributed to the knowledge of the life-histories of these insects and to the economic considerations which led to the more recent investigations into the practicability of control of the losses attributable to *Hypoderma bovis*. Tribute is paid to the entomological knowledge available to the Scottish committee, but attention is drawn to the fact that the biochemical, chemotherapeutic and pathological knowledge at its disposal fell below that standard. Hence a fair computation of the real national loss involved was not forthcoming, and thus an opportunity has been lost to bring the urgency for the need of these measures to the notice of bodies who could have allocated funds for investigation and control.

The use of a reliable derris preparation for the destruction of the larvae gave good results and is emphasized.

The valuable results achieved abroad by collaboration between interested parties and the decision that state legislation is essential to effective control are stressed. Macdougall has pointed out the lethal powers of a freshly prepared derris root wash against ox warble flies, and that for effective control one dressing a week, administered four or five times, must be applied, commencing at about the third week in March. The availability of reliable derris root preparations makes the task relatively simple.

II. An annotation of I.

III. An editorial discussion of I.—H. E. BYWATER.

STENIUS, R. (1935). Nötbromsens förekomst i Finland och de av den förorsakade skadorna. [**Ox Warble Flies in Finland**].—*Skand. VetTidskr.* **25.** 133-146. 1 fig. [English summary : abst. from orig.]

Information obtained from veterinary surgeons and tanneries in 1934 has enabled the author to estimate the number of cattle in Finland affected with larvae of the warble fly to be about 27 per cent. of a total number of about one and a half million head. The fly is not evenly distributed all over the country. The south-east seems to be the most heavily affected, whereas large areas in the middle and north are completely free. The annual losses caused by the larvae, chiefly based on foreign investigations, with allowances made for conditions in Finland, are calculated at 3,132,000 Finnish marks on hides (a reduction in price of 25 per cent.), 3,915,000 on meat (10 kg. loss in weight per head) and 25,116,480 on milk yield (10 per cent. reduction), amounting to a total loss of about 33 million marks (approximately £192,000).—GUSTAV NAERLAND (FARSUND).

KNIPLING, E. F. (1935). **The Larval Stages of** *Hypoderma lineatum* **Devillers and** *Hypoderma bovis* **Degeer.**—*J. Parasit.* **21.** 70-82. 2 tables. [27 refs.]

Knipling shows that it had been generally accepted that *H. lineatum* and *H. bovis* passed through four or five stages in their larval development. His own

findings support the contention of GEDOELST (1922) that there are only three stages. Among approximately 1,000 larvae taken from the oesophagus no moulting forms were found, and the author assumes that no moult occurs during the oesophageal stage.—J. S. STEWARD.

KNIPLING, E. F. (1935). **Gasterophilus inermis Brauer, a Species of Horse Bot not previously recorded from North America (Diptera : Oestridae).**—*Ent. News.* **46.** 105-107. [1 ref.]

Knipling records the occurrence of *Gastrophilus inermis* Brauer in the rectum of a horse – this being the first record of this species in North America. The larvae were allowed to hatch and the identification of the adults confirmed the diagnosis of *G. inermis* made on an examination of the living larvae. A description of the morphology and a brief review of the life-history are quoted from DINULESCU's monograph [see this *Bull.* **3.** 419].—J. S. STEWARD.

SEDDON, H. R. (1935). **Blowfly Attack in Sheep : Its Prevention by Fold Removal (Mules' Operation).**—*J. Coun. sci. industr. Res. Aust.* **8.** 25-26. [Also published as *Pamphl. Coun. sci. industr. Res. Aust.* No. 37].

This article reports the results of an experiment designed to test the efficacy of surgical removal of skin folds from the crutch of ewes (Mules' operation) in preventing blowfly strike. During the first year after treatment 22·6 per cent. of strikes occurred in 116 treated sheep as compared with 70 per cent. in a similar number of untreated sheep running under the same condition. During the second year after treatment about half as many strikes occurred in the treated sheep as compared with the untreated sheep. Some practical considerations concerning the adoption of the Mules' operation by sheepmen are discussed.—W. I. B. B.

I. DAVIES, W. M., & HOBSON, R. P. (1935). **Sheep Blowfly Investigations. I. The Relationship of Humidity to Blowfly Attack.**—*Ann. appl. Biol.* **22.** 279-293. 6 tables, 1 graph. [10 refs.]

II. HOBSON, R. P. (1935). **Sheep Blowfly Investigations. II. Substances which Induce *Lucilia sericata* Mg. to Oviposit on Sheep.**—*Ibid.* 294-300. [10 refs.]

I. In this paper, the first of a series on different aspects of the sheep maggot problem, the effect of humidity on sheep maggots is studied as they are more prevalent in moist weather. A method was devised for studying the humidity at the base of the wool. It is shown that the micro-climate at the base of the wool is normally too dry for the development of the maggots as the eggs and young larvae of *L. sericata* Mg. are extremely sensitive to desiccation at 37°C. Dry conditions prevail in the fleece near the skin except in the region of the rump where the wool is often rendered moist by soiling with faeces and urine and so rendered suitable for the development of eggs and larvae.

II. The second paper describes experiments on substances which attract *L. sericata* to lay their eggs on sheep. It was found that excreta of *Lucilia* larvae were extremely attractive : faeces from scouring sheep, stale urine and bacterial cultures were also effective but these substances did not induce oviposition unless placed close to the skin of a live sheep ; neither sheep skin, wool nor other live animals can take the place of sheep. The attraction is not due to chemical or bacterial changes in the fleece since actual contact with the skin or wool is not necessary. It is considered that the natural odour of the sheep may be the influencing factor.
—J. S. STEWARD.

FULLER, Mary E. (1934). **The Insect Inhabitants of Carrion : A Study in Animal**

Ecology.—*Bull. Coun. sci. industr. Res. Aust.* No. 82. pp. 62. 3 figs. on 1 plate, 28 tables, 2 charts. [65 refs.]

There is a definite succession of inhabitants in a carcass, each stage of decomposition being characterized by a particular group of insects. Competition between the larvae is the main factor regulating the general blowfly population. The competition is for food and space and competition operates at all seasons when blowflies are active. The population of emerging adults is primarily determined by the amount of carrion available. Taking the case of *Lucilia* it was found that intra-specific competition reduces the size and numbers of individuals, that inter-primary competition, by further limiting the niche occupied by *Lucilia*, intensifies the effect produced by intra-specific competition. Competition with *Chrysomyia rufifacies* produces a greater reduction in numbers of *Lucilia* than either of the other types of competition, but does not greatly affect the size of the individuals. Predaceous histerids and staphylinids prefer the larvae of *Lucilia* and the other primaries, and so favour the secondary flies. The parasite *Mormoniella* attacks a relatively higher proportion of the secondary flies, thus favouring *Lucilia* and other primaries.

Destruction of blowfly eggs and larvae by predaceous beetles, ants, earwigs, etc., reduces the intensity of competition and on the whole favours the blowflies rather than otherwise. Weather limits the seasonal occurrence of the different species of blowflies and their activity. Weather factors influence competition, firstly by determining what species are present and secondly by affecting the decomposition rate of the carcass.

The most important fact of general biological interest arising from the work is that competition, both intra- and inter-specific is the primary factor limiting the blowfly population. The ecological work provided information which led to a demonstration of succession of blowflies on sheep, with the result that attack could be directed at the primary species. It has been shown that a natural enemy, to be of value in limiting the population as a whole, must itself be the primary factor influencing abundance. No natural enemy of this type is yet known.

—H. McL. Gordon.

Fraenkel, G. (1935). **A Hormone causing Pupation in the Blowfly** *Calliphora erythrocephala*.—*Proc. roy. Soc. Ser. B.* **118.** 1-12. 8 figs. on 1 plate, 2 tables. [17 refs.]

Fraenkel shows that pupation in the blowfly, *C. erythrocephala*, is induced by a hormone which is secreted from 16 hours before pupation at 20°C. The hormone is produced either in the ganglionic mass or its immediate neighbourhood. Once the hormone has been discharged pupation can occur even without the co-operation of the nervous centres.—J. S. Steward.

O'Flaherty, F. (1935). **Demodectic Mange of Domestic Animals.**—*N. Amer. Vet.* **16.** No. 8. 19-23. 3 figs.

The author gives a brief description of *Demodex folliculorum* and its life-history, with a short account of demodectic mange in cattle and swine.

In cattle it occurs most frequently in adults although it is also met with in calves from four to six months old. There is little loss of hair and the lesions may be unnoticed unless the skin is carefully palpated. The first part to be affected is the skin of the neck and shoulder, whence it may spread to all parts of the body. In swine the large size of the hair follicles allows the more rapid spread of the parasites. Photomicrographs illustrate the condition in both cattle and swine.

The possibility of the disease spreading in skins and hides in storage was

investigated, but it was found that the parasites died with the death of the skin. Furthermore, it was not possible to transfer demodectic infestation from salt-cured skins to living calves.

Follicular mange is said to cause great economic loss to the leather industry.
—J. S. STEWARD.

DEMIDOWA, A. J. (1935). Die Helminthenfauna der Hunde in Aserbeidschan. [**The Helminth Parasites of Dogs in Azerbaijan**].—*Arch. Schiffs- u. Tropenhyg.* **39.** 412-416.

An examination for parasitic worms was carried out on 151 stray dogs from various towns and villages in the republic of Azerbaijan. Sixteen various species were found in the course of the work, these being eight nematode spp. – *Toxascaris leonina*, *Ancylostoma caninum*, *Uncinaria stenocephala*, *Spirocerca sanguinolenta*, *Dirofilaria repens*, *Trichuris* (*Trichocephalus*) *vulpis*, *Trichinella spiralis* and *Dioctophyme renale* ; six cestodes species – *Dipylidium caninum*, *Taenia hydatigeria*, *Multiceps multiceps*, *Echinococcus granulosus*, *Hymenolepis diminuta* and *Mesocestoides lineatus*, and two trematode species – *Dicrocoelium lanceatum* and *Eupharyphium melis*. *Toxascaris leonina*, *A. caninum*, *S. sanguinolenta* and *Dipylidium caninum* were the most prevalent. *Dioctophyme renale* and *H. diminuta* were each only found in one instance.—E. L. TAYLOR.

FAULENBORG, G. (1935). Invasion med ikter hørende til underfamilien Heterophyinae ciurea hos en kat. [**A Fluke of the Sub-Family Heterophyidae Ciurea in the Cat**].—*Maanedsskr. Dyrlaeg.* **47.** 249-254. 2 figs. [3 refs.]

Catarrhal gastro-enteritis was found in a sick cat when killed. The content of the small intestine harboured eight specimens of small flukes (0·7 to 1 mm. and 0·3 to 0·5 mm.). Possibly they were identical with *Ciurea quinqeangularis*, Skjrabin 1923. The source of infection was not discovered.
—H. C. BENDIXEN (COPENHAGEN).

PETRUSCHEVSKY, G. K., & BOLDYR, E. D. (1935). Propagation du bothriocéphale (*Diphyllobothrium latum*) et de ses larves plérocercoides dans la région du nord-ouest de l'U.R.S.S. [**The Distribution of** *D. latum* **in North-West Russia**].—*Ann. Parasit. hum. comp.* **13.** 327-337. 8 tables. [25 refs.]

Figures are given showing the localization of plerocercoids of this parasite of man and domestic animals in nine different species of fish in lakes in the north-west of Russia where, in some of the villages, the incidence of infestation among fishermen ranges as high as 70 per cent. In the perch the muscles appear to be the part most usually infected, but in other fish the internal organs carry most of the plerocercoids. [This shows the danger of feeding fish offal to dogs, cats and pigs in countries where this parasite occurs]. The walls of the digestive tract are a frequent localization but the lumen was found also to be carrying living plerocercoids.—E. L. TAYLOR.

WOODLAND, W. N. F. (1935). **A New Species of Avitellinine Tapeworm,** *Avitellina sandgroundi*, **from** *Hippotragus equinus*.—*Ann. trop. Med. Parasit.* **29.** 185-189. 7 figs. [9 refs.]

Woodland here describes a new species of *Avitellina* from a roan antelope. The specimen was collected in the Belgian Congo and differs in several respects from *A. centripunctata*, notably in the alternate arrangement of the uteri, the larger testes and the smaller eggs, which are discharged directly to the exterior instead

of into the ventral canals. [It is not unlikely that this species may be found in sheep].—E. L. TAYLOR.

TETLEY, J. H. (1935). **Distribution of Nematodes in the Small Intestine of the Sheep. [Correspondence].**—*Nature, Lond.* **136.** 477-478.

The jejunum is the region favoured by nematodes naturally occurring in sheep, those of each genus sharing a common area. Species of the genus *Trichostrongylus* occur most anteriorly, i.e. nearest the abomasum, followed by those of *Strongyloides*, *Nematodirus* and *Cooperia* in that order. Neither active nor passive migration of the worms occurs. Unknown stimuli, acting on the infective larvae, determine the area each species occupies and are present at the point of entrance of the bile and pancreatic juice. *Trichostrongylus* species respond to these stimuli in the abomasum, as well as in the jejunum. *T. axei* is sensitive to these, *T. colubriformis* and *T. vitrinus* less so, so that these two latter species inhabit both abomasum and small intestine. In healthy sheep each species shows a normal frequency distribution unchanged throughout the period of infection, but in unhealthy animals the distribution is erratic.

Cooperia oncophora, *C. punctata* and a third species unidentified are normally parasitic in cattle, but show an erratic distribution in sheep.—G. LAPAGE.

—. (1935). **Can Ascaris Infection be Air-Borne?**—*Lancet.* **229.** 313-314. [5 refs.]

—. (1935). **Ascaris Infection and the Bore-Hole Latrine.**—*Indian med. Gaz.* **70.** 333-334.

The first annotation deals with the importance of the question of the transportation of ascaris infection, and possibly of other worm infections by air currents into houses, etc. In this connexion the second note makes the pertinent observation that in Panama there is a rise in the incidence of ascaris infection at the height of the wet season, when rain is exceptionally heavy and continuous, throwing doubt on the suggestion that air-borne infection is of importance. [Transportation of worm infection by air has been suggested as the explanation of the introduction of helminthic infections to domestic animals and birds in new premises].—E. L. T.

SCHOOP, G. (1935). Die Spulwurmkrankheit der Füchse. [**Ascariasis of the Fox**].—*Dtsch. tierärztl. Wschr.* **43.** 433-435. 3 figs.

Losses from ascaris infestation in fox cubs appear to be on the increase and the prevention of infestation, therefore, takes a relatively more important place in the management of fox farms. Wholesale treatment of infected animals may be carried out after microscopic examination has shown which are carrying worms, a dose of 0·3 g. of carbon tetrachloride or tetrachlorethylene per kg. body weight being recommended. Accidents not infrequently happen when cubs are treated, however, and it is advisable to keep anthelmintic treatment down to a minimum. With this end in view it is recommended that control of the infestation be attempted by anthelmintic treatment of all infected adults before that are placed in the breeding cages. These should be very carefully disinfected by cleaning woodwork, covering the earth with a layer of sand or gravel, boiling drinking water and scalding food troughs and by maintaining strict sanitary conditions during the time that the cubs are there. It is considered that, by the repeated application of this system year after year, ascaris infestation may be eradicated.—E. L. TAYLOR.

DE ALMEIDA, J. L. (1935). Revisão do genero Haemonchus Cobb, 1898 (Nematoda : Trichostrongylidae). [**A Revision of the Genus *Haemonchus* Cobb,**

1898].—*Mem. Inst. Osw. Cruz.* **30.** 57-114. 70 figs. on 17 plates, 10 tables. [Numerous refs.]

The scope of this paper may be judged from a short account of the principal headings under which the various parts are arranged. Following introductory matter the author gives a short account of what has been written on the characters most useful for classification, a list of the genera of Trichostrongylidae, a bibliographical list of papers on the genus *Haemonchus* and on the various species, the hosts from which they have been reported and their geographical distribution. This is followed by a description of the genus, a key to the species, description of the species, a list of hosts arranged systematically, tables of measurements of various parts of several individual worms of the species *H. contortus* and *H. similis* comparing their variability, and of average measurements of various parts of all the species, showing their differences.

Finally there is a bibliography of 28 pages. In the author's opinion, only seven of the 13 species are valid ; these are *H. contortus*, *H. longistipes*, *H. similis*, *H. lunatus*, *H. mitcheli*, *H. vegliai* and *H. bedfordi* ; *H. bispinosus*, *H. cervinus* and *H. lawrenci* are left as *species inquirendae* and *H. fuhrmanni*, *H. atectus* and *H. pseudocontortus* regarded as synonyms of *H. contortus*. It is considered that differentiation of the species can only be satisfactorily carried out on the basis of male characters.
—E. L. TAYLOR.

HOBMAIER, M., & HOBMAIER, A. (1935). **Intermediate Hosts of Aelurostrongylus abstrusus of the Cat.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1641-1647. 2 figs. [6 refs.]

The material for this work was secured from ten cats from the region of San Francisco ; 520 cats were examined and the incidence thus proved to be about 2 per cent. An unsuccessful attempt was made to confirm CAMERON's findings that mice could be infected with the first-stage larvae. After several fruitless attempts had been made to infect small vertebrates and insects, positive results were obtained by the introduction of larvae to various species of molluscs. Snails belonging to the genus *Epiphragmophora* Doering, 1873, proved to be the most suitable ; the snails *Helminthoglyphia californensis*, *H. nickliniana*, *H. arrosa*, and the slugs *Helix aspersa*, *Agriolimax agrestis* and *Ariolimax columbianus* were also successfully infected although infection could not be brought about quite so readily in these species. The first larval moult occurs about ten days, and the second four to five weeks or more after infection. The old larval skin is retained after each of the two moults. The first-stage larvae for this work were isolated from the faeces of infected cats, attempts to raise the first-stage larvae from the unsegmented eggs of the parasite having been unsuccessful.—E. L. TAYLOR.

KOTLÁN, S., & VAJDA, T. (1934). Strongyloides-tanulmányok. [**Studies on Strongyloides**].—*Allatorv. Lapok.* **57.** 198-205. 3 figs., 1 table. [Numerous refs.] [Abst. from abst. in *Rev. gén. Méd. vét.* **44.** 227].

S. ransomi (Schwartz and Alicata) is a common strongyle of pigs in Hungary. Young pigs only are affected, adult pigs possessing immunity. Larval forms of the parasite are sometimes able to infect other domestic animals.—J. E.

HSÜ, H. F. (1935). **A Study of Some Strongyloidea and Spiruroidea from French Indo-China and of Thelazia Chungkingsensis Hsü, 1933 from China.**—*Z. Parasitenk.* **7.** 579-600. 31 figs. [14 refs.] [In English].

The finding of the following species of veterinary interest is recorded :–

Oesophagostomum asperum from the goat, *Dictyocaulus khawi* n.sp. from the pig and *Tetrameres fissispina* from the domestic fowl.

D. khawi differs from *D. arnfieldi* in that the postero-lateral and medio-lateral rays of the bursa are entirely fused ; it differs from *D. viviparus* in that one of the three branches of the dorsal ray is externo-lateral, and from the other members of the genus in the length of the spicules and certain characters of the dorsal rays.

The author gives details of measurements of various parts of the body of *T. fissispina* and discusses the structure of the oesophagus, lips and head papillae.

—E. L. TAYLOR.

DE LANGEN, C. D. (1934). **The Origin of the Anaemia in Ankylostomiasis.**—*Meded. Dienst Volksgezondh. Ned.-Ind.* **23.** 135-157. 1 table. [In English].

This paper deals with the anaemia of ancylostomiasis, as seen in the Dutch East Indies, and arranges the available information under the headings :– " Loss of Blood from the Intestinal Canal " ; " The Intoxication Theory " ; " The Process of Haemolysis and Regeneration " ; " Stimuli towards the New Formation of Blood ", and " The Significance of Diet for the Clinical Picture of Ancylostomiasis ". At the end of his critical treatment of the data the author concludes that loss of blood, deficient diet and the condition of the intestinal canal work together in bringing about the severe anaemia of ancylostomiasis. He thinks that there may be a damage to the bone-marrow as well, but that the toxic factor is not necessary for the adequate explanation of the clinical picture of the disease.

—E. L. TAYLOR.

DE JESUS, Z. (1935). **Observations on Natural Cases of Kidney-Worm Infestation in Swine with Special Reference to Practical Method of Diagnosis.**—*Philipp. J. anim. Indust.* **2.** 49-65. 9 figs. on 2 plates, 4 tables. [12 refs.]

This work was undertaken in an attempt to determine whether infestation of immature or adult swine with *Stephanurus dentatus* results in the development of any symptoms which might be of value in the diagnosis of the disease. Observations were made on a large number of adult pigs, both *ante* and *post mortem*, at the abattoir at Los Bãnos and on several young pigs belonging to various owners around Manila. The incidence of the infestation was found to be 63·98 per cent. Infested adult animals showed no symptoms that could be considered as characteristic although infestation may be a primary cause of death, even in adults. In spite of the high incidence of the infestation, and the many animals observed (200 animals daily for four weeks), only one case of partial paralysis of the hind quarters was observed [the kidney worm is supposed by some to be a factor in the causation of paralysis of the hind quarters in pigs]. Even moderate infestation in young pigs, however, frequently resulted in stunted growth and emaciation. Examination of the urine was found to be the most useful aid to diagnosis ; even the urine of young pigs of only three to five months was in most cases found to carry the eggs of *S. dentatus*. This observation is in disagreement with that of SCHWARTZ who considered that pigs are not likely to discharge eggs until they are six months old.

—E. L. TAYLOR.

TETLEY, J. H. (1935). **Ecological Studies on *Nematodirus* species in Sheep in Manawatu district, New Zealand.**—*J. Helminth.* **13.** 41-58. 4 tables. [4 refs.]

N. filicollis and *N. spathiger* were abundant, usually occurring together ; *N. abnormalis* and *N. helvetianus* occurred in smaller numbers ; all four occurred normally only in the duodenum and jejunum. The areas of the

intestine inhabited by each species were well-defined and did not differ materially in lambs of different ages, the distribution of worms being determined by the time of reaction of the incoming larvae to factors which they experienced for the first time when they entered the intestine. The nature of these factors is not discussed. The peak area for *N. filicollis* was always anterior to that for *N. spathiger*, although both covered about the same area ; *N. abnormalis* overlapped *N. filicollis* ; the peak area for *N. abnormalis* was posterior to that for *N. filicollis*.

Nematodirus infections are self-curative, usually disappearing when lambs are nine months old. None of the nine lambs used contained more than five thousand worms. High numbers in November to April alternated with low numbers in May to October, most of the infection being usually incurred in spring and early summer (September to December) and during the first three months of the lamb's life. Infection accumulates most rapidly in lambs soon after birth, is greatest at three to six months, declines at six months until at nine months it disappears completely. Death was never due to *Nematodirus* and unthrifty lambs did not contain more worms than fat, healthy ones. No evidence was found of age resistance.

Trichostrongylus colubriformis and *T. vitrinus*, *Cooperia curticei* and *C. oncophora* had reached peak numbers when *Nematodirus* was declining and *Cooperia* especially was located posterior to *Nematodirus*, so that these other species had little or no effect on nematodirus infections. *Chabertia ovina*, *Trichuris ovis* and *Strongyloides papillosus* showed erratic courses of infection and had no effect on nematodirus infections.

Factors which could modify immunity to *Haemonchus contortus* infections, e.g. lactation and devitalizing influences in summer and autumn, could not alter acquired immunity to *Nematodirus*. Nematodirus infections and egg-laying continued several months after immunity to further infection was acquired, though this prevented maturation of further larvae ingested. Adult *Nematodirus* were continually being swept down the intestine from the normal area of infection ; females thus swept away were senile and contained fewer eggs, although it was not clear how far their senility was due to the host's immunity.—G. LAPAGE.

DOS SANTOS, V. (1934). Monostomose renal das aves domesticas. [**Renal Monostomiasis of Pigeons**].—*Rev. Produc. anim., Rio de Janeiro.* **1.** 203-211. 4 figs. on 3 plates. [1 ref.] [English and French summaries : abst. from orig.]

From *post-mortem* examinations carried out on pigeons from Rio de Janeiro and the surrounding district, it was found that 15·7 per cent. were infested with a trematode inhabiting the collecting tubules of the kidneys and the ureters. The same parasite was found in two hens sent to the Institute of Animal Biology for examination.

The author considers it to belong to the family Eucotylidae and to be a new species of the genus *Tamerlanea* Skrjabin, 1924. He suggests the name *T. bragai* n.sp. and gives a full description to show how it differs from the other species of this genus, *T. zarudnyi* Skrjabin, 1924.

HJORTLUND, S. (1935). Fortsatte Undersøgelser over Forekomsten af Trikinen hos Hunde og Katte i København samt en Oversigt over dens Forekomst hos Mennesket og Svinet i Danmark. [*Trichina* **in Dogs and Cats in Copenhagen and in Man and Swine in Denmark**].—*Skand. VetTidskr.* **25.** 501-543. 5 tables. [13 refs.] [English and German summaries : abst. from orig.]

A detailed and historical review of trichinosis in man, swine, dogs and cats

in Denmark. From the work of others and from a new survey by the author on about 500 dogs and 500 cats it is clear that trichinosis is practically absent from the country, no cases of infestation in man, dogs or cats having been found in recent years. Slaughtered pigs are now very rarely found to be infected. A strict meat inspection service for Danish pigs has been in operation for many years.—J. E.

MORRIS, M. L., DINKEL, J. H., & GREEN, D. F. (1935). **Laboratory Diagnosis of Dog Heart Worm.**—*N. Amer. Vet.* **16.** No. 9. 34.

The authors advocate the following method :– 1 c.c. of blood withdrawn from a vein is immediately placed in 5 c.c. of a 2 per cent. acetic acid solution and thoroughly mixed ; it is then centrifuged for three to five minutes ; after decanting the supernatant fluid a drop of the sediment is examined for embryos under the microscope.—E. L. TAYLOR.

DESCAZEAUX. (1935). Les " plaies d'été ". [" **Summer Sores** "].—*Rev. vét. milit.* **19.** 181-198.

This paper is a review of present-day knowledge of " summer sores " of horses, more particularly the disease as met with in France and in the French colonial possessions. The history, geographical distribution, symptoms, pathological anatomy, aetiology, pathology, diagnosis, prognosis, treatment and prophylaxis are each considered in turn and in considerable detail.

The condition is attributed to one cause only, namely, the presence of larvae of *Habronema* in wounds. These, acting as irritants, bring about the typical symptoms of the condition. The difficu ty of demonstrating the parasite is admitted. In France and Australia larvae of *H. megastoma* have always proved to be the parasite involved. Differences in the clinical picture reported from certain other countries possibly arise through larvae of the other *Habronema* being the causal agents. The life-history of *H. megastoma* is given in detail.

The typical calcareous deposits seen in lesions (" bursati ") are described as agglomerations of degenerated parasite nodules. Eosinophilia of the edges of lesions and of the circulating blood is found to be a constant and characteristic feature of the condition. The probable relationship between gastric, pulmonary and cutaneous habronemiasis is considered at some length. The last two conditions are regarded as representing irregular locations of the parasite. These arise from external infection only and not by dissemination *via* the blood stream.

There is a note on the mechanism of larval inoculation by the fly, and on the part played by humidity and warmth in facilitating the same. --C. DAVENPORT.

IMMUNITY.

RICH, A. R., & MCKEE, Clara M. (1934). **A Study of the Character and Degree of Protection Afforded by the Immune State Independently of the Leucocytes.** —*Johns Hopk. Hosp. Bull.* **54.** 277-311. 13 figs. on 3 plates, 1 table. [34 refs.]

Immunized rabbits were treated with benzol to cause leucopenia and were then infected intradermally with virulent Type I pneumococci. It was found that in these immunized, leucopenic animals the presence of immune antibody influenced both the character of bacterial growth and movement and also the course of infection. The bacteria as they proliferated adhered to each other and to the tissues and were held at the site of inoculation for hours after non-immune controls had died of septicaemia. This phenomenon of immobilization was also observed

in passively immunized animals and is believed to have been due to the antibody content of the fluids of the immune body. In the absence of leucocytes the growth of immobilized bacteria proceeds uninterruptedly until great masses have formed at the site of infection, the bacteria eventually penetrating into the blood and lymph streams, causing septicaemia. If only a relatively few leucocytes appear at the site of infection, the bacteria are rapidly ingested and destroyed. The authors conclude that, in addition to its opsonizing power, the humoral antibody prevents the immediate spread of bacteria throughout the body, but that acquired immunity creates no condition of the fluids or fixed tissues which can prevent the progressive growth of bacteria in the absence of phagocytes.—F. Blakemore.

Asmundson, V. S. (1934). **Inheritance of Disease Resistance with Special Reference to Poultry.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 2569-2572. 1 table. [16 refs.]

This is a discussion of evidence which has been obtained from various publications concerning inherited resistance to disease and the possibility of genetic differences being involved.—Gwilym O. Davies.

—. (1935). **Herd Immunity.**—*Lancet.* **229.** 141-142.

Herd immunity may be of two types :– (a) dependent upon the social or biological structure of the herd, being non-specific and due to conditions unfavourable to the transmission of infection, and (b) dependent upon the individual immunity resulting from natural infection or from artificial immunization.

In the experiments of Topley and Greenwood the immunity of type (a) is eliminated and artificially induced epidemics are studied in mice. The course of events may be influenced by immunizing mice before admission to infected herds, and in mouse typhoid, although the individual mice have a slightly improved expectation of life, the epidemic is not modified in its course. With a disease such as ectromelia, a virus disease, the results of immunization are much more striking and effective.

The results in general are in accord with the view that natural immunization, combined with the rate of accumulation of susceptibles in a community, is the most important single factor in determining the form of the endemic-epidemic prevalence of human disease which is provided with ample channels of natural spread ; furthermore, that vaccination against a virus disease tends to be far more effective than vaccination against a disease due to bacteria of the invasive type.
—R. Lovell.

Descazeaux, J., & Richou, R. (1935). Recherches sur l'immunité anti-staphylococcique naturellement acquise chez différentes espèces animales. [**Naturally Acquired Antistaphylococcic Immunity in Different Species of Animals**]. —*Bull. Acad. vét. Fr.* **8.** 374-383. 4 tables. [15 refs.]

Using haemolytic and intradermal methods to determine the antitoxic content of the sera of the animals examined, the authors experimented on 50 horses, 11 cattle, 32 sheep, 12 dogs and 10 pigs. The results of these experiments caused the authors to conclude that naturally acquired immunity is probably due to apparent or inapparent staphylococcic infection of the skin or mucous membrane, especially in the horse and pig ; natural immunity is lasting and strong, and can be transmitted, giving the new-born animal a passive immunity, and that the stability and endurance of natural active immunity opens up the possibility of immunizing animals against staphylococcic infection by means of a specific antitoxin.—M. Burke.

HOFE, F. W. (1935). Untersuchungen über die Blutgruppen des Pferdes. [**Blood Groups in Horses**].—*Arch. wiss. prakt. Tierheilk.* **68.** 371-385. 2 tables. [19 refs.]

Hofe has investigated the blood groupings of 403 horses. The properties already described by SCHERMER and KAEMPFFER [see this *Bull.* **5.** 575.], A–α, B–β, C–γ, D–δ, E–ϵ and F–ϕ, have again been found. Using test cells and test sera for each property and an O control, 26 tests in all for each blood sample, every horse could be definitely placed in the above system. Of the theoretically possible 64 (2^6) cell groups, 58 were recognized. Most blood samples showed several cell properties, a few none and a small percentage as many as five. The structure AB occurred most frequently, viz. in 13 per cent. of all horses. The frequency of the various cell properties apart from their combination was as follows :– the property B occurred in 75 per cent., A in 63 per cent., D in 43·2 per cent., F in 27·8 per cent., C in 22·8 per cent. and E in 22 per cent.

As regards the serum properties, α and β were, in accordance with Landsteiner's law, always present when the cell properties A and B were absent. Furthermore the α serum property also occurred in a proportion of samples of group A blood (4 per cent. of horses). In contrast with the serum properties α and β, the serum properties γ, δ, ϵ and ϕ were often absent when, according to Landsteiner's law, they might have been expected. As a result the accepted groupings could be further differentiated, 324 blood structures being possible, of which 154 were actually encountered. The blood make-up is, therefore, almost an individual character of each horse. The highest number of horses which showed exactly the same structure was 6·2 per cent., i.e. those which had the structure ABD/o. Some evidence was obtained that thoroughbreds and other breeds were characterized by the frequency of certain combinations, but much further work is necessary to establish any real racial difference.—A. W. STABLEFORTH.

BACANU, C. (1935). Sensibilité des cobayes tuberculeux à la malléine. [**Sensitivity of Tuberculous Guinea Pigs to Mallein**].—*C. R. Soc. Biol. Paris.* **119.** 1089-1090.

The author's investigations showed that the skin of tuberculous guinea pigs was sensitive to mallein, but that the non-specific allergic reaction was feeble when compared with the tuberculin reaction. A similar sensitivity was demonstrated in the brain tissue of infected guinea pigs injected intracerebrally. Subcutaneous and intraperitoneal injections of mallein gave negative results.

—GWILYM O. DAVIES.

GERBER, L. (1935). Beitrag zur Bang-Schnellagglutination der Milch. [**Rapid Milk Agglutination Test for** *Brucella abortus*].—*Wien. tierärztl. Mschr.* **22.** 531-537. 1 table. [7 refs.]

Using one drop of milk and one loopful of test suspension of approximately one-fifteenth the volume of the milk, Gerber found that a 20 per cent. bacterial suspension gave considerably better results than a 2·5 per cent. suspension, i.e. it gave about a third more positive results. Most of these gave a relatively low titre by the tube method but their specificity was supported by blood tests and clinical data. The results obtained by the tube method and the rapid method using the thicker suspension ran closely parallel. Whey gave considerably weaker results than whole milk. Filtration of the milk did not result in loss of activity but is considered superfluous if a stained suspension is used. In the case of the cloudy samples of whey, not seldom encountered, which also often give rise to

non-specific flocculation, it is claimed that the rapid test gives far more definite reactions than the tube method.—A. W. STABLEFORTH.

HERRMANN, O. (1935). Ein Massstab zur Bewertung der Röhrchenagglutinationsprobe, insbesondere bei der Brucellose. [**Scheme for Evaluating the Agglutination Test, Particularly for Brucella Infection**].—*Berl. tierärztl. Wschr.* **51.** 324-325.

The author describes a scale for the evaluation of the macroscopic tube agglutination test he has elaborated.

The degrees of agglutination are designated as 0, ±, 1, 2, 3 and 4 or, if desired, the last four phases may be subdivided into 1–, 1, 1+, 2–, 2, 2+, etc. A little practice is required in order to be able to detect with the naked eye the finer distinctions demanded by the scale. More than 20,000 tests were carried out with typhoid, paratyphoid and *Brucella abortus* antigens using sera derived from human beings and the horse, cow, donkey, sheep and pig.—N. S. BARRON.

DONHAM, C. R., & FITCH, C. P. (1935). **A Method for Preserving Brucella abortus for Use in the Preparation of Agglutination Antigen.**—*J. Amer. vet. med. Ass.* **87.** 188-190. [5 refs.]

The authors find that the difficulties introduced by the loss of sensitivity which brucella suspensions undergo when kept for long periods can be overcome by preserving the bacteria in the dry state.

The bacteria are grown on solid media and washed off with carbol-saline. The resulting suspension is carefully filtered to remove particles of agar, boiled for ten minutes or heated on a steam bath for two or three hours and filtered again. The bacteria are then sedimented and washed twice in order to remove a gummy material which may be present and prevent proper drying. The bacteria are then suspended in 18 times their volume of 0·5 per cent. carbolized distilled water, a power shaker and beads being used, and dried in petri dishes so as to leave a thin film. The dried bacteria are stored in glass-stoppered bottles at room temperature and retain their agglutinating properties unimpaired for at least 18 months. When required for use for the plate agglutination method 3·1 g. of dried bacteria are suspended in 100 c.c. of salt solution containing 0·4 per cent. gelatin and 0·5 per cent. phenol, and again thoroughly shaken in a power machine.—A. W. S.

CANIĆ, R. (1935). Vezivanje komplementa ovčjih boginja. [**Complement-Fixation in Cases of Sheep Pox**].—*Jugoslov. vet. Glasn.* **15.** 419-423. 4 tables. [9 refs.]

The author considers that the complement-fixation test can be successfully used for the diagnosis of sheep pox. In tests limited to the use of 21 sera he used the Kaup modification of the Wassermann reaction. He found that antigen prepared from the subcutaneous tissue by Borrel's method was stable, and confirmed MANNINGER'S work demonstrating the presence of specific amboceptors in the blood of sheep artificially immunized against sheep pox.

ROSENBERGER, G. (1934). Die Diagnose des ansteckenden Verkalbens aus Nachgeburten mittels der Komplementbindungs- und Präzipitationsmethode. [**The Diagnosis of Contagious Abortion by Complement-Fixation and Precipitation Tests of Placental Extract**].—*Inaug. Diss. Hanover.* pp. 32. 8 tables. [Numerous refs.]

A study has been made of the possibility of testing extracts of foetal membranes for the presence of *Brucella abortus* by serological means. To this end a record

has been made of the anamnesis, clinical findings, serum antibody content, microscopic findings and results of precipitin and complement-fixation tests of foetal membrane extracts of 47 cows suspected of harbouring this infection. The complement-fixation test was definitely superior to the precipitin test and gave results in fairly close agreement with the other evidence. It is thought that such a test would furnish useful confirmatory evidence when isolation of *Br. abortus* in pure culture was impracticable. As antigen in the test an extract of foetal membranes was made in carbol saline which was then carefully filtered to render it clear.—E. J. PULLINGER.

TAYLOR, G. L., & ADAIR, Muriel E. (1935). **The Precipitation Reaction. Experiments on Multiple Zones.**—*J. Hyg., Camb.* **35.** 169-173. 3 tables. [7 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **10.** 596. Signed W. W. C. TOPLEY].

One of the problems that arises in the study of precipitation reactions is whether the occurrence of two zones in an ordinary serial antigen-antibody titration necessarily indicates the presence of two different antigens and antibodies.

The authors have prepared an antiserum containing antibodies for two unrelated antigens – crystalline egg albumen, and crystalline horse serum albumen. When this serum was titrated against mixtures of these two antigens, the serum being kept constant and the antigenic mixture tested in falling amounts, it was possible, by varying the amounts of the two components in the antigenic mixture, to produce a single optimal zone of flocculation, or two well-separated zones. It is evident, therefore, that, while a single zone does not necessarily indicate that only one antigen-antibody system is involved, double, or multiple, zones suggest the presence of two, or more, antigen-antibody systems.

SCHAEFER, W. (1935). Le sérodiagnostic du bacille de la tuberculose aviaire. Identification de quatre souches aviaires isolées de l'organisme du cobaye. **[The Serological Diagnosis of Avian Tuberculosis. Identification of Four Avian Strains Isolated from the Guinea Pig].**—*C. R. Soc. Biol. Paris.* **119.** 169-172. [2 refs.]

This is a description of the method of identification of the avian type of tubercle bacillus by employing an antiserum prepared from the specific antigen which this type of bacillus had been found to contain. The method described is of use when dealing with avirulent or feebly virulent strains.

Complement-fixation reactions were carried out with methylic antigens of the unknown strains and typical avian antiserum, previously deprived of its non-specific antibody by absorption with bacilli of the bovine strain. Confirmatory tests were also put up using antisera prepared from the unknown strains. In this way, the antigens of four strains isolated from guinea pigs were found to be similar to the antigen of the typical avian strain.—D. R. WILSON.

WITTPAHL, W. (1934). Beiträge zur Serodiagnostik der Rindertuberkulose. **[Serodiagnosis of Bovine Tuberculosis].**—*Inaug. Diss. Berlin.* pp. 46. 4 tables. [42 refs.]

Wittpahl carried out complement-fixation tests with whey and blood from 65 cows which were afterwards slaughtered. He used four different antigens, viz., Beller's acetone-lecithin extract [this *Bull.* **5.** 829.], old tuberculin, the pyridine extract of Witebsky, Klingenstein and Kuhn [this *Bull.* **2.** 538.] and a *Brucella abortus* antigen. Ophthalmic tuberculin was also frequently used.

The anticomplementary action of whey samples from drying cows, or from

cows with mastitis, can be removed by heating to 62° to 65°C., or, if necessary, even higher, without damaging their specific fixing capacity. Boric acid is not to be recommended as a preservative.

Of the 65 cows tested, 18 had complement-fixing bodies in the whey of one or more quarters ; all of these had udder tuberculosis. The whey of the other 47 was negative and 46 were free from tuberculosis of the udder. Of 32 tuberculous quarters, 31 were detected serologically.

Of the total 65 animals, 63 showed tuberculous changes in one or other organ ; in 45 cases the blood serum gave positive fixation. The blood was positive in every case when tuberculosis of the udder was present.

The Witebsky antigen proved the best ; it detected 94 per cent. of the positive samples tested with it ; old tuberculin detected 88 per cent. whilst, in the author's hands, Beller's antigen only detected 72 per cent.—A. W. STABLEFORTH.

TEALE, F. H. (1935). **Some Observations on the Question of the Various Manifestations of Antibody Activity being due to Separate Antibodies or an Immune Substance acting Differently under Various Conditions.**—*J. Immunol.* **28.** 241-278. [4 refs.]

Experiments are recorded bearing on the question of the different aspects in antibody activity being due to the action of a single immune substance or to various types of antibody. Previous observations by TEALE and EMBLETON [(1913). *Z. ImmunForsch.* **20.** 1.] showed that the lytic antibody in the early stages of its development appeared as a type of specifically differentiated complement ; later it appeared as a thermolabile immune substance and finally as the usually recognized thermostable antibody. These observations are confirmed and it is also shown that agglutinins, precipitins and protective properties of immune sera are thermostable from the beginning of their formation. From these observations the author concludes that the various types of antibody activity are different from one another developmentally.

Further work showed that when dealing with anti-pneumococcal sera prepared against " S " strains of pneumococci Types I and II, the agglutinins and precipitins, but not the protective power, could be removed by exposure to " S " homologous organisms in the ice-chest whereas, by heating the sera at 65°C., the protective power was destroyed and the agglutinins were unaffected. Similar results were obtained with sera prepared against *Erysipelothrix rhusiopathiae* (*B. erysipelatis suis*). With sera prepared against *Salmonella paratyphi B*, *Bact. dysenteriae* Sonne and *S. typhi*, both agglutinins and protective power were removed by exposure to the homologous sera in the cold, whereas heating at 65°C. destroyed the protective power, leaving the agglutinins intact.

With diphtheria antitoxin, heating at 60° and 65°C. destroys both the precipitating and neutralizing power.

The general conclusions drawn are that the different manifestations of antibody activity are not due to the activity of the same immune substance acting differently under varying physical conditions, but that they are manifestations of the activity of different antibodies.

Attention is drawn to the fact that a serum may have a high agglutinin titre and yet have no protective power and *vice versa*, which tends to support the author's hypothesis. [On the other hand, one should be cautious in interpreting the results as above, when one considers the complexity of bacteria from the antigenic point of view. Each separate antigen or chemical grouping tends to induce the formation of its own antibody, but it appears as if the antigen responsible for the invasive activity of bacteria may not always coincide with the one concerned in agglutination.

The recent work of FELIX and his colleagues on the " Vi " antigen of *S. typhi* indicates the importance of the different antigens concerned, when dealing with corresponding differences in agglutinins and protective antibody content].
—R. LOVELL.

IRWIN, M. R., & BELL, F. N. (1935). **On Natural Antibodies in the Rabbit and Hereditary Resistance to Infections of Brucella suis.**—*J. infect. Dis.* **57.** 74-77. 4 tables. [17 refs.]

Although during recent years there has been an increasing amount of experimental evidence pointing to heritable factors as playing a large part in the resistance or susceptibility of an individual to an infectious disease, there is as yet little or no knowledge from the immunological point of view of the mode of expression of this variation. The present study is an attempt to find whether the bactericidal power of whole blood may be an important factor.

Rabbits were used and they were descendants of strains described by MANRESA [(1932). *J. infect. Dis.* **51.** 30.] as segregating into lines resistant and susceptible to the porcine strain of *Br. abortus.* Bactericidal power was assessed by the greatest number of organisms killed by a given quantity of citrated blood, animals whose blood destroyed more than 200 organisms per ml. being classified as showing a " high " bactericidal action, those whose blood killed less than 50 a " low " action, others being classed as intermediate. Resistance or susceptibility was determined by intraperitoneal injection of pregnant females at the 15th or 16th day of pregnancy with a dose of about 30 million viable organisms. Animals called " resistant " produced at full time a litter some of which were living, those classed as susceptible aborted. Statistical data are given to show that low and high bactericidal action were closely correlated with susceptibility and resistance to the porcine strain. A comparison of the bactericidal power of rabbit blood against the porcine and bovine strains of *Br. abortus* showed that it had much greater bactericidal action against the latter. Further specificity of the bactericidins was demonstrated by showing that bactericidal action against the porcine strain of *Br. abortus* was independent of the bactericidal action against *Salmonella enteritidis.*—A. W. STABLEFORTH.

JANSSEN, L. W. (1934). Over droog mond- en klauwzeerserum. [**Dried Antiserum against Foot and Mouth Disease**].—*Versl. werkzaam. Staatsveearts. Onderzoek.-inst. 1933-1934.* pp. 93-107. 4 tables. [19 refs.] [*Verbatim* translation appears in *Münch. tierärztl. Wschr.* **86.** 327-331].

In order to standardize serological work on foot and mouth disease, standard dried antiserum was prepared by a modification of the method recommended by HARTLEY [(1925). *Brit. J. exp. Path.* **6.** 180]. Dried antiserum of this type remained at constant strength for considerable periods of time. The advantages of purified sera are discussed. These include complete solubility of the serum in saline owing to the removal of lipoid material ; also, the purified serum proteins are less readily denatured by heat. The physico-chemical properties of purified serum proteins are compared in considerable detail with those of the crude protein. Purified foot and mouth disease antiserum loses very little of its protective capacity as a result of purification.—E. J. PULLINGER.

PLANTUREUX, E. (1935). Technique de préparation et mode d'emploi d'un sérum spécifique contre la maladie de jeune âge des chiens (maladie de Carré). [**The Preparation and Use of Specific Antiserum against Dog Distemper**]. —*Rev. vét., Toulouse.* **87.** 257-262. [14 refs.]

The author describes a quick method of preparing an antiserum against dog

distemper in very resistant adult dogs of Algiers, reinforcing their natural immunity by injecting 20 c.c. of formolized virus (prepared according to Lebailly's method). The dogs are totally bled out about 12 days later and 30 to 40 of the sera thus obtained are mixed to produce a fairly standard product. The therapeutic dose was 3 to 6 c.c. per kg. body weight. This rate can be increased for grave cases and young or very small patients.—C. V. WATKINS.

BORTHWICK, G. R. (1935). Ueber die antigenen Eigenschaften der Gifte der zur Gruppe des Welch-Fraenkelschen Gasödembazillus gehörenden Mikroorganismen, nebst Bemerkungen über die experimentelle Erzeugung enterogener Anaerobeninfektionen bei Schafen. [**The Antigenic Properties of the Toxins of the *welchii* Group with Regard to Experimental Anaerobic Infections in Sheep**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 289-302. 6 tables. [16 refs.]

This is a comparative study of the antigenic properties of the toxins produced by the type members of the *Clostridium welchii* group of bacteria. Monovalent antitoxic sera were obtained from rabbits, and the properties and values of these were estimated when tested against the different types of *Cl. welchii* toxin. Included in the group of sera tested were *Cl. welchii* Types A, B, C and D of Wilsdon's classification, *Cl. ovitoxicum* (Bennetts), three commercial samples of *Cl. welchii* serum and also laboratory-made *Cl. septique*, *Cl. histolyticum* and *Cl. oedematiens* antitoxic sera. The toxin-antitoxin mixtures were inoculated intravenously into mice and intracutaneously into guinea pigs. The protective values of Types A, B, C and D antitoxin and one commercial sample of *Cl. welchii* antitoxin against a test dose of *Cl. welchii* culture (Types A, B, C and D) were also estimated. These tests were carried out on guinea pigs, the dose of serum being 1 c.c. and the test dose 0·5 c.c. of a 24-hour-old liver broth culture, both being given intramuscularly.

With the exception of *Cl. welchii* Type D and *Cl. ovitoxicum* toxins, which were antigenically identical, distinct differences in the properties of the *Cl. welchii* type toxins were established. The commercial samples of sera consisted of *Cl. welchii* Type A antitoxin. *Cl. septique*, *Cl. histolyticum* and *Cl. oedematiens* toxins were antigenically distinct from those of the members of the *Cl. welchii* group. After neutralization of the gastric secretion and diminishing peristalsis, the author was able to produce a fatal enterotoxaemia in sheep by dosing with alkalized broth cultures of *Cl. ovitoxicum*.—D. R. WILSON.

I. NICOLLE, C., & LAIGRET, J. (1935). La vaccination contre la fièvre jaune par le virus amaril vivant, desséché et enrobé. [**Vaccination against Yellow Fever by Virus Emulsified in an Oily Substrate**].—*C. R. Acad. Sci., Paris.* **201.** 312-314.

II. NICOLLE, C., & LAIGRET, J. (1935). Vaccination contre le typhus exanthématique par le virus typhique vivant, desséché et enrobé. [**Vaccination against Typhus with Virus Emulsified in an Oily Substrate**].—*Ibid.* 372-374. [1 ref.]

I. The method of immunization against yellow fever which has been practised in French colonies consists of the inoculation of several doses of an attenuated strain. With the object of reducing the number of injections, the authors have administered large amounts of living virus enveloped in a slowly absorbable excipient in a single dose. The vaccine was composed of virulent mouse brain attenuated in glycerin at 20°C., dried in the presence of sodium phosphate and then emulsified in egg yolk, olive oil or a combination of both. All these vaccines gave

good results, but practitioners preferred the egg yolk preparation diluted with nine parts of water immediately before use.

II. Similar experiments to the above were undertaken with typhus fever using a rat strain of the virus. Three vaccines were tested. The first, containing virus in egg yolk only, was abandoned since five out of nine persons developed a mild attack of typhus fever following injection. The second, which was an olive oil suspension, yielded one benign case of fever out of 98 cases, while the third, comprising virus in a mixture of egg yolk and olive oil, was entirely innocuous.

It is claimed that by the use of oily emulsions large amounts of virus can be inoculated with safety.—R. E. GLOVER.

DISEASES, GENERAL.

LECLAINCHE, E. (1935). Rapport administratif du Directeur de l'Office pour l'année 1934-1935. [**Report of the Director of the Office international des Epizooties for the Year 1934 to 1935**].—*Bull. Off. internat. Epiz.* **10.** 352-354.

Leclainche here gives a brief review of the activities of the Office during the past year. He deplores the lack of progress in the standardization of animal disease statistics and reports as supplied by different countries. It is at present impossible to form a comprehensive idea of the health situation of the world.

The Office co-operated with the Hygiene Committee of the League of Nations over the problem of standardization of biological products. Certain institutes are being invited to prepare standard products as a pattern for all manufacturers to use [see also this *Bull.* **5.** 673].—J. E.

LECLAINCHE, E. (1935). La situation sanitaire en 1934. [**Animal Diseases during 1934**].—*Bull. Off. internat. Epiz.* **10.** 1-15. Discussion pp. 366-368. 3 tables, 1 chart, 2 maps.

This report covers the countries of Europe and those territories bordering the south and east of the Mediterranean Sea, and was compiled from individual national reports received [see preceding abstract]. Each disease of importance is dealt with in turn and comment is made on its absence as well as its presence in different countries. The report, being already condensed, does not admit of further abstraction. The diseases mentioned include foot and mouth disease, sheep pox, anthrax, swine erysipelas, swine fever and swine plague, contagious bovine pleuro-pneumonia, glanders, rabies, dourine, tuberculosis and bovine contagious abortion ; also brief reference is made to equine and ovine infectious anaemias [these are separate entities : see this *Bull.* **5.** 493. for information concerning the latter], Aujeszky's disease, swine influenza and paratyphoid and parasitic diseases.

The author urges the importance of national campaigns for the suppression of bovine tuberculosis and bovine contagious abortion.—J. E.

HILTON, G. (1934). **Infectious Diseases of General Interest to the Pacific.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 2941-2947. Discussion pp. 3091-3092.

This is a general survey of infectious diseases met with in Canada and the methods employed for their control and eradication.

Canada, unlike most other countries, has not at any time experienced any disastrous epizootics of foot and mouth disease, rinderpest or contagious bovine pleuro-pneumonia. It is also singularly free from protozoan diseases. A policy

of slaughter and compensation has succeeded in freeing the country from dourine and effecting considerable improvement with regard to glanders. Sheep pox and epizootic lymphangitis are foreign to the country. Occasional but not serious outbreaks of anthrax and swine fever occur. Caseous lymphadenitis is not prevalent and cases of sheep scab and mange are seldom seen. Tuberculosis and contagious abortion are the two chief problems. A few cases of Johne's disease and swine erysipelas have been confirmed. In poultry, *Salmonella pullorum* infection and laryngotracheitis seem to be the most important diseases.—GWILYM O. DAVIES.

—. (1934). **Animal Diseases in California.**—*Rep. Calif. agric. Exp. Sta. 1932-1934.* pp. 83-93.

The report records the eradication of glanders, Texas fever and foot and mouth disease from California. It also gives the progress of the schemes against contagious abortion in cattle and pigs, anaplasmosis in cattle, vesicular exanthema of pigs (a virus disease which resembles foot and mouth disease but does not affect cattle, sheep or goats), infectious encephalomyelitis of horses and mules, " paratuberculosis " [? Johne's disease] in sheep, polyarthritis in young lambs and infectious keratitis in sheep. Among poultry diseases mention is made of infectious laryngotracheitis and a " gasping disease " of young chicks which closely resembles laryngotracheitis and is also caused by a filtrable virus.

The report also records the discovery by COLE *et al.* of a new hormone present in the blood of pregnant mares from the 41st to the 125th day of pregnancy. This hormone produces oestrum when injected into the blood stream of the cow, sow, ewe and other species.

Details are also given of a two-year experiment on the breeding of thick and thin shelled eggs and gives the percentage of hatchings for the two types.—G. D. M.

SHILLINGER, J. E. (1934). **The Significance of Wild-Life Diseases.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 2977-2980. Discussion p. 3092.

The need for increased effort to prevent the natural waste of wild life is emphasized. The natural periodic reduction in numbers of certain wild animals occurs as the result of the operation of factors, dependent upon population density, etc., which are well known. Existing methods for controlling the movements of wild species and the lack of attention to detoxification of industrial waste products call for consideration. The importance of parasitism and the interrelation of diseases common to man, domestic and wild animals should be determined.
—GWILYM O. DAVIES.

GRIEDER, H. (1935). Sektionen gefallener und wegen Krankheit entpelzter Farmfüchse sowie Kotuntersuchungen. [**Diseases of Silver Foxes**].—*Schweiz. Arch. Tierheilk.* **77.** 81-93. 6 figs. [10 refs.]

A report of three years' work involving the examination of 389 dead foxes and 317 separate samples of material. The *post-mortem* findings are given in tabular form and the important diseases are described.

Ascariasis (*Toxocara canis*) affects foxes of all ages and, unless controlled by sound hygienic measures, leads to continuous reinfestation. The uterus of the vixen may be penetrated by larvae, which thus reach the cubs before birth. Severe disease is often seen in cubs two to three weeks old. For treatment, an anthelmintic is administered in capsule form [see paper by SCHOOP, p. 143].

Hookworm disease (*Uncinaria stenocephala*) attacks foxes of all ages over about three months. The minute parasite lives in the small intestine and, when numerous,

causes severe wasting and dysentery. Carbon tetrachloride in capsule given in autumn is efficacious.

Lungworm disease (*Crenosoma vulpis*, *Eucoleus aerophilus*) causes a chronic illness which may end fatally. No curative treatment is known and attention must be paid to hygiene and good feeding.

Verrucose cystitis and nephritis caused by *Capillaria plica* are rare in Switzerland.

Coccidiosis (*Isospora canivelocis*) causes dysentery in cubs and whole litters may die in a short time. No therapeutic agent is known, but hot soda solution is recommended for disinfecting pens.

Tuberculosis is contracted from milk and flesh, etc., and both digestive and respiratory types are observed. The ophthalmic tuberculin test is recommended for diagnosis [see this *Bull.* **5.** 829]. Paratyphoid infection (*Salmonella choleraesuis*) sometimes causes sudden death in young foxes. *Post-mortem* changes include swelling of the spleen, liver and lymph glands, gastro-enteritis and icterus. In this disease the infection is acquired from meat and offal.

Diplococcal septicaemia is sometimes seen as a condition superimposed on worm infestation. Affected foxes show great swelling of the spleen, fatty degeneration of the liver and inflammation of the pericardium and peritoneum.

Gastro-enteritis is very common in foxes, but the cause is complex and may be connected with dietary errors.—J. E.

MIESSNER, H., & KÖSER, A. (1935). Fohlenkrankheiten. **[Diseases of Foals].** —*Dtsch. tierärztl. Wschr.* **43.** 145-150. 1 fig., 1 table. [5 refs.]

This is a treatise on the infectious diseases of foals hitherto described indiscriminately by German farmers as " Lähme ", the English equivalent of which is, in this case, " joint-ill " or " navel ill ". Many years' study of foal diseases in Germany, made possible by the organization named " Reichszentrale für die Bekämpfung der Aufzuchtkrankheiten " [see this *Bull.* **5.** 174.], has enabled much material to be collected, as a result of which five separate infections have been differentiated. The examination of 232 foals in Germany showed that the relative incidence of these infections was as follows :– 79 cases (34 per cent.) *Streptococcus pyogenes* infection, 59 cases (25·4 per cent.) *Bact. equirulis* infection, 7 cases (3 per cent.) *Corynebact. pyogenes* infection, 3 cases (1·3 per cent.) *Salmonella abortus equi* infection and 1 case (0·4 per cent.) *S. typhi-murium* infection. In 83 cases (35·7 per cent.) no pathogenic bacterium was discovered.

S. abortus equi INFECTION.—This is contracted from the dam *in utero* ; affected foals are born weak and die within 24 hours. The lesions include congestion of the liver, swollen spleen (" sago spleen ") and petechiae in the kidneys and heart. The joints, umbilicus and lungs are normal. No treatment is of any use.

Bact. equirulis INFECTION.—This is usually contracted perorally from contaminated material after birth, the foals becoming ill between the 15th and 30th hours after birth. Foals which have difficulty in standing up during the first few days of life, e.g. those with knuckling of the fetlock, etc., are particularly liable to pick up infection from the floor. Intra-uterine infection sometimes occurs, as was proved in eight of the authors' cases.

Cases of this type of disease are commonest in April, when the weather becomes warmer and wetter. Dead foals show pyaemic nephritis and focal necrosis of the liver ; the lungs are sometimes altered, feeling grainy to the touch.

The organism is ubiquitous in some localities, and very careful measures have to be taken to keep the foals clean at and after birth (clean straw, mare kept very clean and her udder cleansed with a mild disinfectant daily). Prophylactic

inoculation of foals with 50 to 100 c.c. of the specific antiserum immediately after birth is advised.

STREPTOCOCCAL INFECTION.—This is the commonest type of disease and is the cause of the true " navel ill " or " joint-ill ". It is most prevalent during the first 14 days of life, but cases may occur later (up to seven weeks or more after birth). Although infection *via* the umbilicus is the rule, the authors stress the fact that it may occur by the mouth also, for instance, from the infected udder of the dam. Vigorous health rather than protection against dirt is the important factor influencing susceptibility.

Purulent arthritis, omphalophlebitis and suppurative foci in the liver are the typical lesions. Prophylactic treatment similar to that advised for the preceding type is recommended. Serum treatment should be carried out on the fourth day after birth, and specific vaccination may follow it two to four days later.

Corynebact. pyogenes INFECTION.—This is a disease of older foals, appearing at the eighth to 10th week. It may be acute or chronic, and is characterized by respiratory disorder and a high temperature. Dead foals show large abscesses in the lungs and pale heart muscle.

Conditions predisposing to infection include dry and dusty air and warm weather. The dust is stated to be the most important factor.

NON-BACTERIAL DISEASE.—Cases of fractured ribs (10), intestinal volvulus (3) and haemoglobinuria (8) are described ; the latter occurred in foals 30 to 40 days old and was similar to myoglobinuria of adult horses.—J. E.

DOWNHAM, K. D. (1935). **Harper Adams Laying Trials Mortality Records.**—*Harper Adams Util. Poult. J.* **20.** 522-526. [13 refs.]

During the year under review, 1934 to 1935, over 2,000 birds were entered for the trials. At the time the results were published the trial was five weeks from its termination and the mortality had reached 18·5 per cent.

The following figures are of value as showing the increase in the average mortality at this trial during the last 12 years :–

1923-1925	5·2 per cent.	1928-1931	8·9 per cent.
1925-1928	6·4 ,,	1931-1934	15·6 ,,

References to the mortality rates at trials in other countries show exceedingly high figures.

An analysis is given of the various causes of the deaths at the trial. The total number of deaths was 380, of which 118 were caused by parasitic worms and 103 by diseases of the reproductive system.

The author expresses many views on laying trials, mortality, etc., for which the original article should be consulted.—NORMAN DOBSON.

GRAYBILL, H. W., & JONES, E. E. (1934). **Seasonal Incidence of Poultry Diseases.**—*Mon. Bull. Calif. Dep. Agric.* **23.** 153-156. 5 charts.

The authors supply curves showing the incidence of *Salmonella pullorum* infection, paralysis, acute coccidiosis, chronic coccidiosis, chicken pox, infectious laryngotracheitis, colds, roundworms, tapeworms, *S. gallinarum* infection and *Pasteurella aviseptica* infection.

They note that the greatest prevalence of disease is during the warm dry season of the year, with a double-peaked curve for *S. pullorum* infection due to its connexion with the hatching season. As the bulk of disease each year is in young stock they believe that a new susceptible population and the age of the birds are the main factors in determining the trend of disease during the year.—N. DOBSON.

LAMBERT, W. V. (1935). **Inheritance as a Factor in Poultry Disease.**—*Poult. Sci.* **14.** 131-136. [36 refs.]

The writer states that this article is a review of the present status of our knowledge of the genetic aspects of disease.

Three possible methods of disease prevention and control are available :– hygiene and sanitation, the use of therapeutic agents and breeding based on genetical knowledge.

Examples are quoted which emphasize the potential importance of the hereditary factor in disease. Whilst little of practical importance has been accomplished in the way of the control of disease by the use of genetical knowledge, the author points out that little attempt has so far been made to use this method in a systematic way.

Meagre studies of disease statistics upon many strains of birds indicate that marked differences in resistance to disease as well as in general stamina are strain characteristics.

The menace of disease to the success of the poultry industry and the increase in the incidence of disease, in spite of sanitation and therapeutic measures, indicate the need for the adoption of a long-term programme of investigation of a vigorous nature.—NORMAN DOBSON.

ROSS, I. C. (1935). **Tick Paralysis : A Fatal Disease of Dogs and other Animals in Eastern Australia.**—*J. Coun. sci. industr. Res. Aust.* **8.** 8-13.

This is a summary of recent work on tick paralysis of dogs in Australia caused by *Ixodes holocyclus*. It has been found possible to demonstrate the toxic principle in the salivary glands of engorging female ticks and to determine the mouse M.L.D. of salivary emulsion. The delay in onset of the disease until the fifth day of engorgement of the female tick was found to be due to the increased production of the toxic principle during the later stages of engorgement. Even where large numbers of ticks engorged on small and susceptible puppies, paralysis was not induced before the fourth day. It was found that dogs could develop a high degree of immunity to tick paralysis and that the serum of such hyperimmune dogs was capable of neutralizing 20 to 40 mouse M.L.D. of toxin per ml. The serum of these animals has been used to treat over 100 cases of naturally occurring tick paralysis with encouraging results.

Tests of tick repellents indicate that preparations of derris root, either in powder form or as an active suspension, confer a high degree of protection for four days. Routine employment of such preparations once a week should be a useful preventive measure.

BOYD, W. L. (1934). **Some Physiologic and Pathologic Aspects of Sterility in Cattle.**—*Cornell Vet.* **24.** 138-145. [9 refs.]

The author comments on the fact that for a long time it has been known that there exists an interrelationship between certain endocrine glands and the organs of reproduction, and through the various investigations upon the subject there now exists a more thorough understanding of this relationship. He discusses the theories of the function of sex hormones and their practical application and forecasts that physical examination will give way to chemical or biological laboratory examinations for the diagnosis of pregnancy.

It is believed that either hyposecretion or hypersecretion of the anterior lobe of the pituitary body may upset the form and function of the ovary, resulting in cystic degeneration. The aetiology and pathogenic changes of ovarian cysts are

described, dysfunction of the endocrine system associated with faulty nutrition being thought to be a common factor in their causation.

Experiments with endocrine products indicated that at present their use for the treatment of sterility is of questionable value.

Phosphorus deficiency is thought to be the most important of the mineral deficiencies which may cause sterility. A low calcium diet did not influence fertility. White heifer disease is discussed ; four cases are reported upon and the results are given of an examination of their reproductive organs.—K. D. D.

MEGGIO, G. (1935). La sterilità enzootica nei bovini. [**Enzootic Sterility in Cattle**].—*Clin. vet., Milano.* **58.** 421-423.

Three outbreaks of enzootic sterility in cattle are recorded. The disease usually occurs in the early months of the year and up to 50 per cent. of the cows in a district may be affected. The most common symptoms observed are catarrhal endometritis, cervicitis and acute granular vaginitis, and these conditions are accompanied by abortion in pregnant animals. The condition clears up spontaneously in five or six months and only a few animals remain permanently sterile. Bulls are affected by exanthema of the penis after serving an affected cow and they undoubtedly play some part in the spread of the disease, the cause of which is not yet definitely established [see also this *Bull.* **5.** 512].—J. A. NICHOLSON.

NAUMANN, H. (1934). Beitrag zur Verwendung des Guttadiaphots bei der Sterilitätsbekämpfung des Rindes. [**Diagnostic Value of the Guttadiaphot Test in Genital Diseases of Cattle**].—*Inaug. Diss. Giessen.* pp. 33. 2 tables. [49 refs.]

The guttadiaphot test was used on 94 cattle, 30 of which were healthy, 19 infected with *Brucella abortus*, 35 with pyometra and endometritis and 10 with ovarian disease. In the cases of pyometra, the test was usually positive, i.e. the blood drops showed an abnormal appearance. It is suggested that this factor might be a useful diagnostic point in the differentiation of pyometra and early pregnancy. —J. E.

GIERKE, A. G. (1934). **Fowl Paralysis.**—*Mon. Bull. Calif. Dep. Agric.* **23.** 146-148. [3 refs.]

The author states that the cause of this condition is as yet unknown, and that the method of diagnosing the disease in the living bird by means of blood counts is not of value, owing to the wide diversity in the total white cell counts and in the varying percentage of lymphocytes, when taken at different times in the same normal bird.

The condition is often associated with chronic coccidiosis or worm infestations, but does occur as a definite disease in itself, without the influence of internal parasites. Treatment is of little value.

For the control of this condition the author recommends sufficient range to keep birds as free as possible from parasites, and a moderate allowance of food. Culling should be practised rigorously and owners should avoid recruiting from flocks in which this disease has been prevalent.—NORMAN DOBSON.

MARTINEZ, C. R. (1935). Une paralysie médullaire de type enzootique chez les équidés espagnols. [**An Enzootic Medullary Paralysis of Horses in Spain**]. —*Bull. Off. internat. Epiz.* **10.** 333-334.

A disease of horses and mules of all ages of unknown aetiology has been observed, chiefly in the south-eastern part of Spain, during the last few years.

Affected animals are emaciated and suddenly collapse while at work or in the stable and die in a short time. The bone-marrow is yellow and gelatinous and shows haemorrhages; the spinal cord is normal and the characteristic symptoms of myoglobinuria are absent. [No more *post-mortem* details are given]. Attempts to transmit the disease by means of blood injected subcutaneously into a horse and mule were unsuccessful.—J. E.

LALOR, A. G., & SPARLING, P. S. (1935). **Lightning Stroke.**—*J. R. Army vet. Cps.* **6.** 200-204.

This article gives an account of a flash of lightning striking a military horse line, of the symptoms observed, and of the progress of the animals sent to hospital.

Fifteen horses were on the line and it was struck at a point between the fifth and the sixth animal. A wooden post supporting the line was present between the point struck and the sixth animal. The immediate result was that all animals except numbers 1, 14, and 15 were down. Number 5 was dead and numbers 2, 3, 4, and 9 were unconscious. Artificial respiration was applied to the unconscious animals and one grain of strychnine was administered. This treatment was very successful. One animal was on its feet in 15 minutes and all were up at the end of 45 minutes. No animal showed definite signs of burning but strabismus, cyanotic membranes, weak pulse, jugular pulse, hemiplegia or paraplegia, and excitability were shown in all cases. In two animals hemiplegia did not appear until four days after the occurrence. Conjunctivitis was present in five cases in either one or both eyes. Excitability was still evident in recovered animals 13 days later, when the article was written.

Eight animals were sent to hospital and of these three were destroyed on account of paralysis. The remaining five were still in hospital.—W. J. IRONSIDE.

GRAHAM, R. (1935). **Results of Inoculating Laboratory Animals with Equine Brain-Tissue Suspensions and Equine Brain-Tissue Filtrates from Spontaneous Cases of so-called Cornstalk Disease.**—*J. Amer. vet. med. Ass.* **86.** 778-780. 1 table. [4 refs.]

A description of "cornstalk disease" (forage poisoning, blind staggers, encephalomyelitis, cerebrospinal meningitis) of horses is given. In the winter of 1934 to 1935, in central Illinois, more than five thousand horses succumbed after showing symptoms of encephalomyelitis. As in two previous outbreaks in Illinois (1893 and 1914), the causal factor or factors were apparently associated with the feeding of damaged corn, or with the pasturing of horses on "cornstalks" (maize stubble). Animal inoculation experiments with suspensions and filtrates prepared from the brains of horses dead of "cornstalk disease" led the author to conclude that equine encephalomyelitis, as it occurred in Illinois, was probably not associated with either the "eastern" or "western" virus of equine encephalomyelitis.—D. R. WILSON.

STURGIS, C. C. (1935). **Review of Some of the more Recent Advances in the Study of Blood Diseases.**—*Science.* **81.** 367-371. [12 refs.]

This article deals with human pernicious anaemia, iron deficiency anaemia and agranulocytosis.

Pernicious anaemia is due to the lack of a substance which is normally stored in the liver and regulates the maturation of red blood cells. This substance is formed by the interaction of an intrinsic factor present in the gastric secretion and an extrinsic factor present in the diet.

Iron deficiency anaemia may result from insufficient intake, excessive loss, or inability to absorb iron.

In treatment large doses must be given and the effectiveness of any agent is directly proportional to its iron content. The author prefers to use reduced iron or iron and ammonium citrate.

Agranulocytosis is brought about by some unknown factor which causes a diminution in the number of polymorphonuclear leucocytes. In some cases the condition has been observed following amidopyrine medication, but it is concluded that the number of persons that react to amidopyrine in this way is not very great.

—W. J. Ironside.

I. Colyer, F. (1935). **Caries and Parodontal Disease in Animals.**—*Vet. Rec.* **15.** 853-858. 6 figs.

II. —. (1935). **Parodontal Disease.**—*Ibid.* 858-859.

I. This article is the substance of a lecture serving as an introduction to a display of dental pathology at the Royal College of Surgeons, London. Caries is defined as a progressive destruction of the tooth tissue by the agency of micro-organisms.

"From the clinical aspect caries may start in (a) the enamel, or (b) the cement or dentine. When caries starts in the enamel the initial lesion is invariably in a position which provides a lodgement for food or other matter. A small breach is made through the enamel into the dentine, where the carious process proceeds more rapidly ; the enamel is undermined and, with the loss of tissue, a cavity is formed which is wider inside than at the orifice and its depth is usually greater than its breadth.

"With caries starting in the cement or dentine the tendency is for the disease to spread superficially rather than burrow, the cavity formed being usually of a shallow-saucer shape. The initial lesion is frequently in a position where food is not likely to lodge."

In the horse, caries always starts either on the free side of the tooth, which is covered by cement, or in the small canals opening on to the table of the tooth.

Parodontal disease, which designates a slow loss of the bone tissue supporting the tooth, is observed in both carnivora and herbivora, and usually affects the upper jaw. In the horse the collection of food between teeth is usually the first stage and advanced cases, in which large cavities in the jaw are formed, are quite common.

II. Topical comments on the incidence of tooth diseases in horses at the present time.—J. E.

Lagerlöf, N., & Hoflund, S. (1935). Rubbningar i idisslarmagarnas funktioner an säregen typ, sannolikt orsakade av skador på nervus vagus, vanligast i samband med traumatisk mag-mellan-gärdsinflammation. **[Functional Disorders of the Stomach (In Cattle) Probably Caused by Injury to the Vagus Nerve as a Complication of Traumatic Gastritis].** —*Svensk VetTidskr.* **40.** 211-222 and 273-284. [15 refs.]

This article is a preliminary communication from the Ambulatory Clinic at the Veterinary College in Stockholm where, during the past few years, the authors have recorded 25 cases of a peculiar chronic disorder of the digestive system in cattle.

Conclusions drawn by Mangold and Klein (1927), from observations made of the effects of neurectomy of branches of the vagus on the physiological mechanism of the different compartments of the stomach in small ruminants, led the authors to suggest that this disorder is due to paralysis of some of the motor nerve branches supplying the stomach. A summary of their experimental data is, therefore, given, as well as a short review of the literature on similar conditions observed by the authors.

The paralysis referred to above is claimed to be caused by inflammatory processes set up by foreign bodies which were almost constantly present. As a rule, such bodies pierce the wall of the reticulum a few inches below the cardia, that is, at a point closely corresponding to the opening in the diaphragm through which the ventral branches of the vagus nerve pass to ramify on the surface of the stomach. These nerve filaments are therefore liable to be included in the inflammatory process.

The symptoms, course and *post-mortem* findings of two different types of the condition are described. In the first, in which the chief symptoms were intermittent tympanites, capricious appetite, distention and hyperactivity of the rumen, *post-mortem* examination suggested a functional stenosis of the reticulo-omasal orifice or, as the authors prefer to express it, a paralysis of the omasum, a condition in which the suction force of that organ, necessary for the onward movement of the ingesta, is checked, the passage of the contents of the rumen therefore being retarded. In the second type, characterized by distention of the abomasum and the omasum, evidence of a functional stenosis of the pylorus was detected. The latter type is not so easily diagnosed *in vivo* as the first. Both types led to emaciation of the animals. Investigations are being continued.—GUSTAV NAERLAND (FARSUND).

PITTALUGA, G. (1934). Las enfermedades del sistema retículo-endotelial. [**Diseases of the Reticulo-Endothelial System**].—*Rev. Hig. Sanid. pecuar.* **24.** 394-486. 1 table. [Numerous refs.]

This paper was read before the National Academy of Medicine (Spain) on the 4th February, 1934. It is a comprehensive review of present knowledge of the functions of the reticulo-endothelial system and its histology, diseases of the reticulo-endothelial system being classified.

BOURGEOIS, E. (1933). Kropfstudien bei der Katze. [**A Study of Goitre in the Cat**].—*Inaug. Diss. Bern.* pp. 60. 9 figs. [Abst. from abst. in *Schweiz. Arch. Tierheilk.* **77.** 280-282].

The author compared the thyroid glands of cats in Bern with those of cats from Paris and Hanover. The majority of cats in Bern were affected with goitre. Cats of all ages were attacked in practically the same proportion. There were two chief types, I and III, and a transition type, II : in type I there was a preponderance of large follicles with cubical or flattened epithelium and a turbid colloid substance ; in type III the small follicles predominated whilst the few large follicles were of irregular form with short cylindrical or cubical epithelium and watery colloid substance, arranged in more compact cell masses.

The goitres of immature cats and of those over eight years old were mostly of type III ; those of cats between maturity and the onset of old age were evenly divided between types I and III. There appeared to be no fixed connexion between the size and the histological structure of the thyroid glands examined, neither was there any connexion between the structure of the thyroid gland and pregnancy or castration.

The histological structure of goitres in cats does not show the variability seen in the goitres of other domestic animals. Adenomata were only found in 2·15 per cent. of all glands examined, but were found in 8·8 per cent. of old cats.

BYERLY, T. C., TITUS, H. W., ELLIS, N. R., & LANDAUER, W. (1935). **A New Nutritional Disease of the Chick Embryo.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1542-1546. 1 fig., 3 tables. [2 refs.]

The authors report a disease of chick embryos, in the third week of incubation,

of eggs from birds on an adequate protein mineral and vitamin D diet. The disease is characterized by shortness of the bones with extreme osteoporosis of the leg-bones. Chicks that hatched had a polyneuritic appearance, becoming normal within ten weeks. Supplements of wheat germ, dried whey or dried liver to the basal diet eliminates or greatly reduces the incidence of the disease, whereas addition of vitamins B_1 and B_2 does not. Direct sunlight with a cod liver oil supplement for laying birds running on pasture is also effective. The authors offer no explanation of the cause.—A. EDEN.

BABONI, N. (1935). Forme atipiche della sindrome d'ipocalcioemia acuta puerperale. [**Atypical Form of Milk Fever**].—*Profilassi.* **8.** 141-145. [13 refs.] [English and French summaries : abst. from orig.]

The author records seven cases of atypical milk fever in which excitement or coma were absent. In each case the symptoms appeared after an easy parturition and were characterized by a slight rise in temperature, inappetence, cessation of rumination, constipation, a reduced milk secretion, rapid pulse and, in one case, severe dyspnoea. The animals were able to walk without assistance but showed a staggering gait and sometimes muscular tremors were pronounced. Four of the animals recovered spontaneously and the others responded to inflation of the udder or the administration of calcium gluconate.—J. A. NICHOLSON.

RHOADS, C. P., & MILLER, D. K. (1935). **Vitamin B_2(G) and Canine Black Tongue.**—*Science.* **81.** 159. [9 refs.]

The authors found that autoclaved yeast extract cured experimentally-produced blacktongue in dogs, but that vitamin B_2(G) is not the active factor, which remains undiscovered.—J. E.

BENDINGER, G. G., & RJANITZINA, I. S. (1935). **The Cause of a Disease of Sheep Simulating Meningitis.**—*Sovyet. Vet.* No. 3. pp. 37-39. [Abst. from French summary].

The authors examined a disease of ewes which, clinically, appeared to be a derangement of the nervous system. The outbreak appeared at the end of the winter and adult ewes only were affected. The mortality rate was 100 per cent. The condition proved to be a vitamin B deficiency.—C. DAVENPORT.

PUBLIC HEALTH.

HUDDLESON, I. F. (1935). **Procedure for the Detection of the Brucella in Milk.**—*Amer. publ. Hlth Ass. Yearb. 1934-1935.* pp. 130-133. 1 fig. [8 refs.] Suppl. to *Amer. J. publ. Hlth.* **25.** No. 2. [Report of the Associate Referee on Methods of Examination of Milk for Evidence of Brucella Infection, presented at the request of the Committee on Standard Methods for the Examination of Dairy and Food Products, to the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934].

This report describes the standard cultural and guinea pig inoculation methods for the isolation of brucella from milk.—GWILYM O. DAVIES.

HAGAN, W. A. (1935). **Examination of Milk for Tubercle Bacilli.**—*Amer. publ. Hlth Ass. Yearb. 1934-1935.* pp. 126-129. Suppl. to *Amer. J. publ. Hlth.* **25.** No. 2. [5 refs.]

This is a report to a committee of the American Public Health Association on standard methods for the examination of dairy and food products. It deals very briefly with microscopic, cultural and animal inoculation tests for the detection of *Mycobact. tuberculosis* in milk.—H. T. MATTHEWS.

FAULDER, E. T. (1935). **Proposed State Meat Inspection Service to Cover the Antemortem and Postmortem Examination of Meat-Producing Animals and Meat Products in Establishments where United States Meat Inspection is not Maintained. A Report of the Committee on Meat Inspection of the New York State Veterinary Medical Society.**—*Cornell Vet.* **25.** 271-275.

The federal meat inspection service covers both *ante-mortem* and *post-mortem* examination of approximately 65 per cent. of the food-producing animals slaughtered in the United States of America. The author maintains that the remaining 35 per cent. should be inspected under the federal system or state, city or town inspection.

A summary of meat inspection conditions in New York state is given. Under existing conditions, where meat inspection is not carried out, questionable practices take place in the slaughter of animals. A state-wide meat inspection law should be introduced, the cost of inspection to be borne either by the state, or by making an assessment of each owner of a slaughtering establishment, and instituting a charge for the inspection of each animal slaughtered and for inspection of meat products. He suggests that the Committee on Meat Inspection of the State Veterinary Medical Society should draw up a scheme for submission to the Commissioners of Agriculture and Markets.—F. H. MANLEY.

DE SAINT MOULIN, L. (1935). Souillure des viandes par le vibrion septique. [**Contamination of Meat by** *Clostridium septique*].—*Ann. Méd. vét.* **80.** 207-213.

The author records his experience in the examination of horse flesh imported to Belgium from Britain. The horses are killed in England and sent to the boat in quarters on the same day; they are normally unloaded and inspected on the following day, but animals killed on Saturday or days preceding holidays are not unloaded or inspected until the second day. The inspection is mainly directed to the detection of glanders and regulations enforce the inclusion of the respiratory system with each carcass. No case of glanders has been detected during the author's term of office, during which an average of 20,000 carcasses have been examined annually. Carcasses are rejected from time to time on account of such abnormalities of flesh as "fever", ineffective bleeding, contamination and infiltration. The latter condition is a serous infiltration, commonly under the scapula and along the abdominal floor, and cultures made from the infiltrated fluid invariably remain sterile. The flesh of these animals is not rejected and is, in fact, sought by manufacturers of sausages.

During warm intervals in the summer, in cargoes which are an extra day in transit, it is not unusual to encounter well-nourished quarters, often normal from external appearances, but which, on closer inspection, prove to be emphysematous. On section a serous fluid exudes and the muscle fibres are found to be dissociated by gas. They are easily detected by striking the quarter with the hand or by searching for crepitation. *Cl. septique*, often in a pure state, can be isolated from these quarters with ease; newly isolated strains are highly pathogenic, 0·01 c.c. of broth culture invariably killing guinea pigs in less than 15 hours. Two out of 50 strains so isolated showed marked loss of virulence after storage. In the author's opinion this is a *post-mortem* contamination, because corresponding viscera except

kidneys are sterile ; the condition may be confined to one or two quarters, and it is only encountered in warm weather. The meat is harmless to pigeons, fowl, mice and cats and a human being who partook of it after boiling suffered no ill effects.

The author's explanation is that anaerobic conditions are set up in the holds of the ships by sealing and by absorption of oxygen by the fresh meat. It has never been encountered in carcasses arriving by train from Poland.—R. S. ROBERTS.

THERAPEUTICS.

BROWNING, C. H., & GULBRANSEN, R. (1935). **Late Relapses and Apparently Spontaneous Cure of Untreated Relapses in Experimental *T. brucei* Infections Treated by Chemotherapeutic Agents.**—*J. Path. Bact.* **41.** 253-257. [6 refs.]

In experiments on the treatment of *Trypanosoma brucei* infections in mice it was found that untreated relapses were sometimes followed by recovery. In most cases such recoveries occurred after treatment with a styryl quinoline compound which is slowly excreted, but in a few instances they occurred after treatment with acridine derivatives. It is believed that these recoveries were complete, as repeated examinations of the blood failed to reveal further trypanosome infection, and in one case subinoculation gave negative results. It is admitted, however, that the subinoculation test does not entirely exclude the presence of persisting infection.—U. F. RICHARDSON.

PARKIN, B. S. (1935). **The Treatment of *T. brucei* Infection of Equines with Antimosan.**—*Onderstepoort J. vet. Sci.* **4.** 281-284. 1 table. [1 ref.]

In the experiment recorded in this paper, five horses were treated with " antimosan ". In three cases sterilization was obtained with several successive doses, but it would appear that the best results are obtained from large doses of the drug, six doses of 3·75 g. failing to sterilize in two cases.—E. M. ROBINSON.

PARKIN, B. S. (1935). **Antimosan-Fastness of *T. congolense*.**—*Onderstepoort J. vet. Sci.* **4.** 285-286.

An attempt was made to see whether drug-fast strains of *Trypanosoma congolense* could be obtained in guinea pigs. " Antimosan " was the drug used, but it was found that there were no indications of the production of drug-fastness even after several generations in subinoculated guinea pigs.—E. M. ROBINSON.

PARKIN, B. S. (1935). **The Symptomatology and Treatment of *Trypanosoma congolense* Infection of Canines.**—*Onderstepoort J. vet. Sci.* **4.** 247-250. 2 figs., 2 tables, 1 chart.

The observations were carried out on one naturally infected dog and several cases produced by inoculation of infected blood. The symptoms shown are more marked than in any other species of animal and are very characteristic. Remarkably good results were obtained in the treatment of the condition with " antimosan ".
—E. M. ROBINSON.

PARKIN, B. S. (1935). **The Intravenous Administration of Styrylquinoline in Equine Trypanosomiasis.**—*Onderstepoort J. vet. Sci.* **4.** 287-288. 1 chart. [1 ref.]

Styryl quinoline No. 314 is an efficient sterilizing drug in *Tryp. brucei* infection of horses. The dose is 0·004 g. per kg. body weight. More than two doses are

necessary at intervals of a week, but better results are obtained from the intravenous inoculation of half the dose five times at intervals of a week or on consecutive days.—E. M. ROBINSON.

LOURIE, E. M., MURGATROYD, F., & YORKE, W. (1935). **Studies in Chemotherapy. XII. The Diffusibility of the Aromatic Arsenicals into Erythrocytes and the Action of the Latter on the Pentavalent Arsenicals.**—*Ann. trop. Med. Parasit.* **29.** 265-282. 7 tables. [10 refs.]

From experiments in which red cells were exposed to solutions of reduced " tryparsamide " in Ringer-glucose, it was established that the drug diffused into the corpuscles in quantities depending upon the concentration of the drug and, to some extent, upon the length of the exposure. If red corpuscles were removed from the drug solution after 15 minutes and placed in fresh Ringer-glucose, a large proportion of their drug content readily diffused out, whilst after exposure for 24 hours much less of the drug diffused out, although it could be proved by laking the corpuscles that their drug content was not materially diminished. Weak concentrations of the drug in nutrient media were found to lose 90 per cent. of the trypanocidal activity after storing at 37°C. for 24 hours. It is suggested that the drug combined with the protein to form an inert compound, and it is an interesting fact that the addition of red blood corpuscles to the media will prevent this loss of trypanocidal activity. On similar experiments with the pentavalent arsenic compound " tryparsamide ", a similar diffusion of the drug into the red cells occurred, but on placing the cells in a fresh solution a substance diffused out of them which had an enormously increased trypanocidal titre. It was also found that a solution of red cells was able to activate " tryparsamide " to a similar degree. The exact nature of this activating constituent of red cells has not been determined, but it was found to resist a temperature of 65°C. for 30 minutes.
—U. F. RICHARDSON.

PARKIN, B. S. (1935). **A Short Study of Bovine Anaplasmosis, with Special Reference to the Chemotherapy.**—*Onderstepoort J. vet. Sci.* **4.** 269-280. 1 table, 5 charts. [9 refs.]

The strain used by the author to produce experimental cases in bovines was at first contaminated with *Theileria mutans* and *Babesia bigemina*, but these were soon lost and the symptoms described are in most cases those of a pure *Anaplasma marginale* infection. Parasites appeared in the blood in some cases as early as the 11th day after infection. The symptoms are described in detail. After trying treatment with " trypaflavine ", the author found that good results were obtained by the use of mercurochrome. The dose given was from 0·4 g. in calves to 1·3 g. for adult cattle. It was given in a 2 per cent. solution in normal saline intrajugularly. The drug had no effect on the parasites in the blood, its value being in its purgative effect.—E. M. ROBINSON.

HARVEY, F. T. (1935). **Some Aspects of Red-Water in Cattle.**—*Vet. Rec.* **15.** 1015-1028. [7 refs.]

British redwater (piroplasmosis) is a regional seasonal disease and many cattle on tick-infested farms may be infected and show no symptoms. Factors such as oestrum, parturition storms and cold play an important part in determining the onset in such cases. Thus, after very cold weather many cases may develop over a wide area.

Three forms are described, the malignant form seen in clean cattle brought into an infected area, the benign form, and cases of irregular occurrence.

The destruction of red blood cells is of short duration, not more than three days, but the animal remains in a critical condition for some time after, and during this time death may take place as a result of neglect in nursing and management. This critical condition is due partly to dysfunction of the liver as a result of necrosis and partly to a lag between the destruction of red blood cells by the piroplasms and their formation by the red bone-marrow.

Early treatment is of great importance and purgation is desirable. The author uses a mixture of sodium sulphate, sodium chloride and tartar emetic, and states that this mixture becomes dangerous after the second day and should not be repeated in full.

Since 1932 a dose of " acaprin " alone has been given to practically every case and the author says that the results appear to indicate that it is of distinct value.—W. J. Ironside.

Berr, A. (1935). Versuche zur Bekämpfung der Dasselplage am Höhenvieh mittels Waschmitteln. [**Research on the Control of Warble Flies in Hill Cattle with Aqueous Dressings**].—*Münch. tierärztl. Wschr.* **86.** 337-342 and 349-354. 10 tables. [11 refs.]

In view of the favourable reports on the " wholesale treatment " method of destroying warble larvae in lowland areas of north Germany, experiments were carried out to ascertain its efficiency in mountain cattle. " Derrilavol ", " derrophen " (two derris root products), copper sulphate, " Dasselfliegel " and a dressing described as " B 1 " were tested as to their efficiency in destroying warble larvae on one application to the warble in the skin lesion. " Derrilavol ", at 20 c.c. per litre, was found to destroy 55 per cent. of larvae, and at 40 c.c. per litre, 71 per cent. of larvae. " Derrophen " destroyed 79 per cent., copper sulphate 62 per cent., " B 1 " 71 per cent., and " Dasselfliegel " in one test proved approximately equal to " derrophen ". A method was tried of stabbing the larvae with a needle, instead of entirely removing them, and by this means 93 per cent. were destroyed, the smaller larvae commonly avoiding the needle. A control with untreated cattle showed that, if the warble in the skin lesions were counted and a re-examination was made four days later, as in the treated animals, at this second examination as many as 58 per cent. of the larvae might be found to be dead. It was also found that none of the dressings were very effective as regards third-stage larvae, of which an average of 17 per cent. emerged between the dressing and the re-examination.

The author [contrary to most observers] considers that in general the application of watery dressings is not satisfactory and, as regards derris preparations, he considers that " rotenone " is not the only larvicidal agent in derris. In confirmation of this opinion he draws attention to the work of Remien [this *Bull.* **4.** 739.] who showed that, after removal of the " rotenone ", the extract of derris root residue still possessed larvicidal properties. The author favours the mechanical method of larval destruction by means of a hook or sharp probe.—U. F. R.

Dumitru, I. (1934). Contribution au traitement de la strongylose pulmonaire ovine. [**The Treatment of Parasitic Bronchitis in Sheep**].—*Ann. Inst. nat. zootech. Roumanie.* **3.** 202-220. 4 figs. on 2 plates, 2 tables. [In French].

From the economic aspect parasitic bronchitis is the most important disease of sheep in Rumania, the mortality not infrequently reaching 50 per cent. Dumitru tried injections with a variety of substances at the Institute and at various farms, both into the lumen of the trachea and into the lung tissue. He also reports in this paper on 84 observations upon the action *in vitro* of various substances upon

Dictyocaulus filaria and *Protostrongylus rufescens*. Intrapulmonary injections gave little encouragement, but some of the injections given intratracheally were decidedly beneficial.

Tincture of iodine in glycerin in the proportion of 1 : 10, and injected in a dose of 2 c.c., was found to be fatal for healthy animals but to be tolerated well and to produce good results in affected animals. Benzene and iodine acted in a similar way. A mixture of tincture of iodine one part, glycerin 50 and distilled water 250, injected in three series of injections at intervals of six weeks, gave good results, two injections being given on each occasion, the second after an interval of one day. The dose of the mixture varies from 5 to 10 c.c. in lambs and 10 to 20 c.c. in adults.

The best results, however, were obtained with a mixture of 1 part creosote, 2 of chloroform, 9 of alcohol, 1 of turpentine, 27 of glycerin and 60 of distilled water. Injections were given three times at intervals of one or two days and in doses of 5 to 10 c.c. for lambs and 10 to 20 c.c. for adults. Results obtained *in vitro* corresponded closely with those obtained *in vivo*.—E. L. TAYLOR.

PERROT, E., GAUDIN, O., & DU NOYER, R. (1934). Les émulsions pyréthrinées dans le traitement de la strongylose pulmonaire. [**Emulsion of Oily Extract of Pyrethrum in Parasitic Bronchitis**].—*C. R. Acad. Agric. Fr.* **20.** 419-422. [3 refs.]

The success which has attended the intratracheal injection of an oily extract of pyrethrum in the treatment of parasitic bronchitis in sheep has not been altogether uniform. *Post-mortem* examinations of experimental animals treated with the oily extract containing a blue dye have shown that the reason is to be found in the oil lying in large drops in various parts of the trachea, and in the nasal chambers, instead of mixing with the mucus. It was also observed that none had gone beyond the bifurcation of the bronchi. In an attempt to overcome this the authors tried an emulsion of the oily extract and found, on *post-mortem* examination of test animals, that the emulsion mixed quite readily with the tracheal mucus and travelled readily along all the ramifications of the bronchi. Field trials have shown treatment by this method to be very efficacious in cases of parasitic bronchitis. No mention is made of dosage.—E. L. TAYLOR.

JOHNSON, E. P. (1934). **Colloidal Iodine and So-Called Blackhead Disease.**—*Virginia agric. Exp. Sta.* Paper No. 27. [Abst. from abst. in *Poult. Sci.* **13.** 379].

The author carried out controlled experiments in the treatment of blackhead in turkeys with a colloidal iodine preparation. Seven flocks of about 90 birds each were used, half of each flock being used as controls, although left in contact with the test birds.

The subsequent percentage mortality in the treated birds was 6·9 and in the untreated birds 11. In the most severely infected flock containing 20 test birds and 21 controls, 17 of the former and 19 of the latter died of blackhead. The dosage employed was three doses of 1 oz. at monthly intervals.—J. E.

I. MINOT, G. R., & CASTLE, W. B. (1935). **The Interpretation of Reticulocyte Reactions. Their Value in Determining the Potency of Therapeutic Materials, especially in Pernicious Anaemia.**—*Lancet.* **229.** 319-330. 17 figs., 1 table. [23 refs.]

II. —. (1935). **An Index of Blood Regeneration.**—*Ibid.* 312.

I. Reticulocytes are immature red blood cells found present in normal

blood in small numbers. Their appearance in increased numbers indicates increased activity of the bone-marrow and constitutes a reticulocyte reaction. The reaction may be due to increased physiological activity or to irritation of bone-marrow. Reaction due to increased physiological activity is seen following the administration of the specific agents in iron, vitamin C and pernicious anaemias, and is in contrast to the reaction induced by irritants in that the blood eventually becomes normal and remains normal.

The reaction to specific substances appears within a period of from two to ten days, progresses to a maximum, and then subsides. Factors that operate in making the reaction variable are :– the initial red blood cell level, the route and the rate of administration, the dose, and the state of the red bone-marrow.

The reaction can be utilized in the diagnosis of specific anaemias and also in the standardization of specific products used in treatment.

II. In this editorial the hope is expressed that, since a means of accurately measuring the potency of certain agents has been devised, it will be put to practical use.—W. J. IRONSIDE.

HENKE, L. A. (1935). **Results of Feeding Sprouted Oats to Correct Sterility in Cattle and Swine.**—*J. agric. Res.* **51.** 51-59. 4 tables. [5 refs.]

This report describes some experimental work in which sprouted oats were fed to cows that had an abnormal breeding history, either failing to come in season or failing to conceive after service, or only carrying their calf for a limited period. In the first experiment no control animals were kept. [In the second experiment, though controls were used, their selection was on a most unsatisfactory basis. Examinations for disease of the genital tract were made in only a few cases. The results of the experiments are described by the author as being inconclusive, but from the nature of the experiments any results obtained would have been valueless].—G. F. BODDIE.

KUHN, W. R. (1934). Ueber Heilwirkungen der Bluttransfusion bei den grossen Haustieren. **[Blood Transfusion in Large Animals].**—*Dtsch. tierärztl. Wschr.* **42.** 797-801. [24 refs.]

This is a lecture on the practical considerations relating to blood transfusion as a therapeutic measure in horse and cattle practice, but it does not give a description of the technique.

Practical observations indicate that, in horses and cattle, blood groups have less importance in this respect than in man, yet it is desirable with horses to make a rapid test before transfusion by mixing the blood corpuscles of the donor with serum from the recipient : if no haemolysis occurs it is safe to proceed with the transfusion of the whole blood, citrated or not. Horses are very good subjects for transfusion therapy, and one to three litres of blood may be given at each treatment ; the same donor should be used every time for a particular patient.

The above haemolysis test is unsuitable for cattle and, as a substitute, it is convenient to transfuse a small amount (100 to 200 c.c.) of blood as a trial test. If haemolysis occurs, it makes itself evident very soon by causing general unrest, dyspnoea, muscular tremors, etc., but these symptoms pass off after a few minutes. If this does not happen, the therapeutic dose of one to three litres may be given.

Blood transfusion has been used with great success in many disease conditions marked by blood loss and toxaemia secondary to severe local infection (metritis, etc.).

Anaphylaxis may follow the use of heterologous blood [see this *Bull.* **5.** 659.] and, if not lethal, can be quickly relieved by the injection of adrenalin. [Interested readers are advised to consult the original for many details not referred to here].
—J. E.

HALLGREN, W. (1935). Angående behandlingen av korsförlamning. [**Treatment of Myoglobinuria in Horses with Insulin**].—*Svensk VetTidskr.* **40.** 170-172.

According to CARLSTRÖM, the muscular lesions which characterize the disorder are caused by disturbances in the carbohydrate metabolism. Presuming insulin (not adrenalin) to be the chief regulator of this metabolism, insulin is indicated [theoretically, but not necessarily as an economic measure] in the treatment of the disease. Promising practical results have supported this view. 10 c.c. (400 units) often given in two doses at a short interval are administered subcutaneously as soon as the symptoms appear. If necessary, the dose is repeated after five to six hours.—GUSTAV NAERLAND (FARSUND).

STACEY, R. S. (1935). **Treatment of Low-Calcium Tetany with Calciferol.**—*Lancet.* **229.** 656-658. 2 figs., 1 table. [8 refs.]

Post-operative symptoms of tetany are reported, associated with low serum calcium following two cases of subtotal thyroidectomy, together with a third case in which idiopathic tetany developed after an attack of influenza. In all cases temporary relief followed parathormone and calcium gluconate treatment, but symptoms reappeared on discontinuing the parathormone injection. A fairly heavy dosage (4 mg.) of calciferol (vitamin D), aided by feeding extra milk and calcium gluconate, avoiding hypercalcaemia, led to rapid relief and a rise in serum calcium, and was followed by a long period free from symptoms. Toxic effects of heavy calciferol dosage were discussed, but only slight loss of weight and appetite and (in one case) some anaemia were recorded provided that there was no hypercalcaemia.—A. EDEN.

LENFELD, J., HÖKL, J., & PETROV, G. (1935). Desinfekční účinnost mýdelného roztoku p-Cl-m-xylenolu (parachlormetaxylenolu). [**Disinfectant Action of Soap Solution p-Cl-m-xylenol (Parachlormetaxylenol)**].—*Zverolék. Rozpravy.* **9.** 133-136. 1 table. [Abst. from German summary].

An account of the disinfectant action on various bacterial strains of parachlormetaxylenol in distilled water, hard water and water containing from 1 to 3 per cent. albumin. Results are summarized in a table.

WICKTOR, C. E. (1935). **The Use of Diathermy in the Treatment of Pneumonia in Cattle.**—*J. Amer. vet. med. Ass.* **87.** 83-86. 1 fig.

A short account of the use of medical diathermy in the treatment of pneumonia in calves following exposure to adverse weather.

Heat was applied to the sides of the chest by means of two flexible pads measuring 8 × 11 inches. These were connected to a Deforest high wave emitter operating on a wave length of 18 m. and 16,600,000 cycles per second. In the most severe case nine treatments, each lasting 25 minutes and spread over five days, were given. Other cases only required two or three applications.

This treatment quickly removes respiratory distress, improves the pulse, causes much nasal discharge and marked general improvement.—J. E.

POISONS AND POISONING.

COUCH, J. F., CLAWSON, A. B., & BUNYEA, H. (1935). **The Toxicity for Sheep of Water Solutions of Hydrocyanic Acid and the Effectiveness of the Nitrite-Thiosulphate Combination as a Remedy.**—*J. Wash. Acad. Sci.* **25.** 272-276. 3 tables. [5 refs.]

This is a further contribution of the authors on the toxicity of cyanides and

methods of treatment [this *Bull.* **5.** 662]. Fresh aqueous solutions of HCN made up as follows were administered to sheep. Cold solutions of the calculated quantity of potassium cyanide and tartaric acid were mixed and the precipitated potassium hydrogen tartrate filtered off. The cyanide content was determined by titration with N/10 $AgNO_3$ and the strength adjusted so that 1 c.c. of the solution contained 15·5 mg. HCN. It was found from experiments on 20 sheep that the minimum toxic dose was 1·05 mg. HCN and that the M.L.D. was 2·29 mg. HCN per kg. body weight. When compared on a cyanide basis the differences in toxicity of HCN and KCN were negligible.

The nitrite-thiosulphate remedy was injected intraperitoneally in doses of 15 c.c. containing 1 g. sodium nitrite and 2 g. sodium thiosulphate. The remedy was found to be 50 per cent. effective against 3 to 4 M.L.D. when injected within four minutes of administration of the HCN. Sheep poisoned by KCN were only protected against 2·75 M.L.D. by the remedy. It thus appears that the remedy is more effective in poisoning by HCN than by KCN.—G. D. Shearer.

Linton, R. G., & Thin, R. G. (1934). **Poisoning of Bullocks by Portugal Laurel** (*Primus lusitanica*) **and Common Elder** (*Sambucus nigra*).—*Vet. Rec.* **14.** 935-936.

Three out of four bullocks died from eating the leaves of laurel and elder. Death was sudden and no lesions were found *post mortem*. Chemical examination soon after revealed that the laurel contained 0·0047 per cent. hydrocyanic acid [cyanogenetic glucoside] and the elder 0·00547 per cent. It is suggested that sheep, which were moved in soon before the deaths occurred, may have rendered the pasture unattractive to the bullocks and so caused them to consume the leaves of the shrubs.—G. D. Shearer.

Lagas, D. (1935). Vergiftiging door Mimosa invisa. [**Poisoning of Cattle by** *Mimosa invisa*].—*Ned.-ind. Bl. Diergeneesk.* **47.** 35.

In a village in Java several cows contracted a disease from which some of them died. There was oedema in the area of the vulva and anus (which seemed to be a continuation of an extensive gelatinous oedema in the lumbar region), a large quantity of free liquid in the abdominal cavity and intense degeneration of the kidneys. The disease was considered to be due to the ingestion of *M. invisa*. [See also this *Bull.* **5.** 456].—J. van der Hoeden (Utrecht).

Sahar. (1935). Vergiftigingsgevallen bij geiten door het eten van "kekara taoen". [**Poisoning of Goats by "Kekara Taoen"**].—*Ned.-ind. Bl. Diergeneesk.* **47.** 34-35.

During transport in the Dutch East Indies several goats showed signs of hydrocyanic acid poisoning and died. A leguminous plant, closely resembling *Phaseolus lunatus*, which has a high cyanogenetic glucoside content, was considered to be the cause of poisoning.—J. van der Hoeden (Utrecht).

Giusti, L. (1934). Investigaciones sobre la toxicidád de la Sesbania punicea Benth. [**Toxicity of** *S. punicea* **Benth**].—*Rev. Med. vet. B. Aires.* **16.** No. 1. 3-11. 3 figs.

Shealy, in the United States of America, discovered that the seeds of *S. punicea* Benth caused death in hens. This plant is grown in large quantities by landowners in the Buenos Aires district and Giusti considers that a warning should be issued about its toxic effects.

In the experiments now described, Giusti used 12 two-year-old hens with a uniform weight of 1,500 g. : eight were used as test birds and four were kept as controls. Five seeds were given as pills to each test bird and a careful check was kept on their temperatures, respiration, etc., but as they were in perfect health after 20 days it was considered that the seeds must have been evacuated intact. A further experiment was carried out, using pigeons. Ten pigeons were used, divided into five groups of two each, one group being used as controls. The first group was given 5 seeds each, the second group 10, the third 15, and the fourth 20 each. A few hours later the birds of the first and second groups showed muscular tremors, high temperature, staggering gait, closed eyelids and ruffled feathers, but they recovered in a little over a fortnight. The birds of the third and fourth groups became progressively worse and all died within 24 hours. *Post-mortem* examination of the birds that died revealed pulmonary congestion, a large amount of coagulated blood in the thorax [? pleural cavities], congestion of the liver, and inflammation of the gastric and intestinal mucosa. Whole seeds of *S. punicea* were found, especially in the gizzards and intestines. If the seeds had all been disintegrated, the symptoms would have been still more severe.

The M.L.D. of these seeds was tested further by experiments on 36 pigeons ; 14 whole or eight ground-up seeds killed birds of 200 to 330 g. body weight. The M.L.D. for rats, guinea pigs, rabbits, toads and frogs of whole and of ground-up seeds are given in a table. The author is working on the isolation of the active principle involved in this poisoning and hopes to give the results in a further paper.

FASANA, A. (1935). Avvelenamenti da piante di granoturco (zeamais) nei bovini. **[Poisoning of Cattle by Green Maize]**.—*Profilassi.* **8.** 23-24. [English and French summaries : abst. from orig.]

Green maize is a dangerous food when given to cattle in large quantities since it contains a cyanogenetic glucoside. [It is possible that other toxic principles can be present]. The first symptoms of poisoning are anorexia, accelerated pulse and respirations, muscular spasms, nervous disturbances, dilation of the pupils and decubitus. In cows, there is a diminution in the milk yield and the author has associated changes in the mammary gland with the ingestion of this plant. In more severe cases, dyspnoea, tachycardia and constipation develop. Uraemia follows from retention of urine and the animal dies after an illness lasting five or six days. On *post-mortem* examination acute nephritis and cystitis are prominent findings. Treatment is symptomatic.—J. A. NICHOLSON.

STEYN, D. G. (1935). **Plant Poisoning in Stock and the Development of Tolerance.** —*Onderstepoort J. vet. Sci.* **4.** 417-420. 1 table. [3 refs.]

The experiments were carried out with the Transvaal Slangkop (*Urginea Burkei*). Rabbits fed with this plant in small amounts did not develop a tolerance. The plant had cumulative effects which, considering that its active principle is in the digitalis series, is not surprising.—E. M. ROBINSON.

PHYSIOLOGY.

MROWKA, F. (1935). Zur Struktur der roten Blutkörperchen. I. Mitteilung. **[The Structure of the Red Blood Corpuscles. Part I]**.—*Arch. wiss. prakt. Tierheilk.* **69.** 75-91. 12 figs. [2 refs.]

MROWKA, F. (1935). Die Veränderung der Struktur der roten Blutkörperchen bei der Malaria des Menschen. **[Alterations in the Structure of the Red Blood Corpuscles in Human Malaria].**—*Ibid.* 92-95. 4 text figs. [2 refs.]

MROWKA, F. (1935). Ueber die Veränderung der Struktur der roten Blutkörperchen beim gesunden und kranken Pferde. **[The Alterations in the Structure of the Red Blood Corpuscles in Healthy and Diseased Horses].** —*Ibid.* 167-174. 7 text figs. [33 refs.]

The author discusses the importance of lipoids in biological chemistry, and the significance of a Gram-positive substance which he believes to be a fat derivative, and which he encountered in connexion with the red blood corpuscles in an investigation of " renguera ", a disease of Peru, possibly related to " lamziekte " of South Africa. In general, he suggests that lipoids play the same part in biological chemistry as water does in inorganic chemistry, and that cell inclusions and cells may be formed by the crystallization of living structures out of lipoid solutions ; in this way he suggests that piroplasms and tubercle bacilli may be carried to the foetus through the placenta, in their dissolved form. In order to ascertain the nature of the lipoid content of red corpuscles, which is obscured by the use of fat solvent fixatives, and to be able to observe the corpuscles in their undamaged state, a method of moist fixation was adopted. A few drops of blood were allowed to fall into newly prepared Ciaccio fixative (5 per cent. potassium bromide 80 parts, formol 20 parts, acetic acid 10 parts). After 24 hours the corpuscles were removed by centrifugation and placed in 3 per cent. potassium bichromate, from which they were later removed, washed and smeared on to slides. The smears were allowed to dry, 70 per cent. alcohol was added, and they were then stained with sudan III and other fat stains, followed by Weigert's method or Giemsa's stain. After staining, the corpuscles were spherical in shape and showed stained and unstained areas, and as the stained areas exhibited an affinity for fat stains it appeared that they contained a lipoid. The corpuscles of cattle and swine differed from those of the horse and man in that there was no sharp distinction between the stained and unstained portion. They also showed considerable variation in size, and homogenous lipoid spheres which sometimes showed a glassy rim were encountered, which the author considers represent immature corpuscles and calls " lypocytes ".

This method of fixing and staining the red blood corpuscles was utilized to examine the blood in two cases of human malaria. In malaria the cells assumed an oval shape with pseudopodial processes in each of which was an inclusion body which was coloured red by the fat stains and black by Weigert's stain. That these processes are not seen in dried smears is explained by alteration of the corpuscles in coagulation. In one case rare " lypocytes " were also seen.

The third paper records investigations in Germany in which, by the examination of the blood of normal horses at the abattoir, the results obtained in Peru as to the appearance of normal equine red corpuscles were confirmed. Further observations were carried out on horses suffering from infectious anaemia, and in these the red corpuscles assumed a spindle shaped or elliptical form, with the stained material finely divided and distributed through the cell, so that the picture closely resembled that seen in the case of cattle and swine. " Lypocytes " were also present. In further observations, however, five apparently healthy military horses were found to exhibit this condition of the corpuscles. Other examples of blood samples fixed and stained by this method from horses suffering from myoglobinuria and morbus maculosus (purpura haemorrhagica) are described and illustrated.—U. F. RICHARDSON.

NICHOLS, R. E. (1935). **The Present Status of Blood Examinations.**—*Vet. Med.* **30.** 289-295. 3 charts, 4 photographs. [4 refs.]

A useful practical review of the normal blood picture of farm animals and of the factors influencing it, numerous articles by other authors being quoted in order to arrive at standard values.

The average counts work out as follows, red blood cells in millions per c.mm. and white blood cells in thousands per c.mm. :—

	Horse	Ox	Pig	Sheep	Dog	Cat
R.B.C.	7·8	6·6	6·7	10·0	7·16	8·43
W.B.C.	9·26	9·0	15·8	7·8	11·68	13·8

The percentage figures for W.B.C. are also given. In conclusion the author discusses the common sources of error in haematological work and discusses the value of such work in clinical medicine.—J. E.

HOLIDAY, E. R., KERRIDGE, Phyllis M. T., & SMITH, F. C. (1935). **Amount of Haemoglobin in the Blood.**—*Lancet.* **229.** 661-665. 2 figs. [Numerous refs.]

After giving a critical survey of various forms of haemoglobinometer, of the methods adopted for standardization of the instruments, and of the methods of expressing the results obtained, the authors describe a haemoglobinometer involving the use of a photo-electric cell, dependent in principle upon a physical constant of haemoglobin. This instrument is simple to work, reliable, rapid and capable of accurate results and is recommended for calibration of other types of haemoglobinometer.—A. EDEN.

AUBLIN. (1935). Leucocytoses provoquées chez le cheval. [**The Production of Leucocytosis in the Horse**].—*Rec. Méd. vét.* **111.** 467-473. 5 figs.

Horses were injected subcutaneously with tapioca, nucleinate of soda, milk, tuberculin and turpentine respectively and leucocyte counts, total and differential, were made before injection and at short intervals afterwards. In all cases except the last, a marked leucocytosis was present within a few hours or on the following day, the polynuclear count being in most cases doubled whilst the mononuclear count was not significantly altered. In the case of turpentine the count dropped for two days and then steadily rose for four days, an observation attributed to the fact that the same animal had responded to tuberculin a week previously.—A. W. S.

SEVKET, K. S. (1934). Die Blutgerinnungswerte (nach Fonio) des normalen Hundeblutes. [**The Coagulation Rate of Normal Dogs' Blood**].—*Folia haemat.* **52.** 260-263. 1 table. [3 refs.]

SCHWAYER, E. (1934). Die Blutgerinnungswerte (nach Fonio) des normalen Pferdesblutes. [**The Coagulation Rate of Normal Horse Blood**].—*Ibid.* **264-270.** 2 tables. [12 refs.]

The technique used for evaluating the coagulation period of the blood of dogs was a modification of that advocated by FONIO. The modifications are recorded. Fifty dogs were studied and it was found that the average coagulation period at 11° to 16°C. was 17 minutes, and at 17° to 28°C., 12 minutes. The coagulation of the blood and the index extensibility, tensile strength and retractibility of the clot were also noted.

A similar study of the blood of 50 horses is recorded. The average coagulation time at 15° to 20°C. was 65 minutes and at 21° to 25°C. it was 30 minutes. The other values are also noted. It was found that the retractibility of red thrombus was 3·6 mm. and of a mixed thrombus as much as 8·7 mm.—E. J. PULLINGER.

HODGSON, E. E. (1935). **The Development of a Blood Volume Formula and the Testing of its Accuracy in the Domestic Animals (Horse, Sheep, Rabbit, Pig).**—*Vet. Bull. U.S. Army.* **29.** 205-232. 1 table. [4 refs.]

An attempt has been made to find a single factor which could be used for the rapid calculation of the total blood volume of an animal if its weight were known. Basing his calculations on the average percentage of the body weight which is due to blood and the specific gravity of blood, the author finds that multiplying the body weight in lb. by 38, or by 83 if the weight is in kg., gives the blood volume in c.c. To test the value of this factor for measuring the concentration of drugs in the blood stream, various animals were injected intravenously with known amounts of glucose. Blood samples were taken immediately before and at varying intervals after the glucose injections and the actual amount present in the blood stream was compared with the theoretical amount. It was found that on the average the amount of glucose present in the blood stream was 7·75 per cent. below the calculated amount. [Whilst the blood formula developed by the author may be mathematically correct, the one direct experiment carried out to prove it is extremely unconvincing].—J. A. NICHOLSON.

BARCROFT, J. (1935). **Foetal Respiration.**—*Proc. roy. Soc. Ser. B.* **118.** 242-263. 1 plate, 8 tables. [18 refs.] [Croonian Lecture delivered before the Royal Society].

BARCROFT, J. (1935). **Respiratory and Vascular Changes in the Mammal before and after Birth.**—*Lancet.* **229.** 647-652. 2 figs., 3 tables. [5 refs.] [John Mallet Purser Memorial Lecture delivered at Trinity College, Dublin].

The information was procured mostly from experiments on sheep by means of Caesarean sections. A short account of the life led by the foetus is first given. The volume of blood in the foetal circulation including placenta was found to be 15 per cent. of the weight of the foetus, and after birth the mass of circulating blood bears the same relation to the weight of the new-born animal. It was found that the proportion of the blood in the foetus increased from 50 per cent. to 75 per cent. and that the proportion in placenta and cord was correspondingly reduced from 50 per cent. to 25 per cent. as the foetal age advanced from 84 to 137 days. This is due to the fact that the placenta does not grow *pari passu* with the foetus but before it and, therefore, in the earlier stages of pregnancy, the placental circulation forms a much greater proportion of the whole foetal vascular bed than it does later on. In the last six weeks of pregnancy the arterial pressure of the foetal sheep more than doubles itself and this makes a great difference to the amount of blood which circulates through the placenta. Up to birth the foetus is essentially an organism of low arterial pressure and in the operation of birth the pressure rises by 20 mm. Hg. to a value of 95 to 100 mm. Hg.

The cause of the first respiration is discussed, and of the three possibilities :– oxygen-want, carbon dioxide excess or increased blood pressure in the brain ; positive evidence is adduced to show that lack of oxygen is the essential cause but that the quantity of carbonic acid in the foetal blood may play some part either in its magnitude or in the degree of oxygen-want necessary. A short description of the course of foetal circulation is given and the important place held by the liver is stressed. Respiration before and after birth is discussed. Oxygen passes

from the maternal to the foetal blood by a process of diffusion, this being greatly facilitated by the fact that foetal blood has a greater affinity for oxygen than the maternal, owing to the foetus possessing a haemoglobin with a higher affinity for oxygen. In the sheep it was found that at the 138th day of foetal life there was no change in the foetal haemoglobin, but by the time the lamb was 39 days old the change to post-natal haemoglobin was complete. From the nature of the dissociation curves of the haemoglobin at birth it would appear that the pre-natal haemoglobin was broken down in some way and then rebuilt into post-natal form. The chemical changes which occur have not yet been discovered. A great increase in the quantity of oxygen consumed was found at birth. In the discussion on this point one interesting reason advanced was that, while the lamb's muscles at rest are in a state of tone and thereby consuming oxygen, those of the foetus are not.

—James Stewart.

Frei, W. (1935). Beziehungen des vegetativen Nervensystems zu Störungen der Fortpflanzung beim weiblichen Rind. [**The Role of the Autonomic Nervous System in Reproduction in Cows**].—*Berl. tierärztl. Wschr.* **51.** 433-438. 1 table. [33 refs.]

In this paper, the author attempts to explain the aetiology of disturbances in reproduction, not from a consideration of merely local cause and effect but from the wider point of view of the interdependency of the glands and organs immediately connected with reproduction, other endocrine glands and the nervous system.

It has become clear that the autonomic nervous system and the endocrine glands are intimately connected with each other and together control the vegetative processes of the animal body. Moreover, since the sympathetic and parasympathetic nerves exercise mutually antagonistic functions, any disturbance in the vegetative processes of the body is accompanied by an increased or decreased activity on the part of these nerves which in turn react on the endocrine glands. Therefore, to understand the aetiology of reproductive disturbances, a full knowledge of the diseases of the endocrine system and of the autonomic nervous system is desirable. This, however, is not as yet forthcoming and up to the present most of the deductions have been made from parallel cases in human medicine.

The anterior pituitary gland plays an important part in the regulation of the reproductive processes and it has been suggested that it alone is responsible for setting them in motion at puberty. The author does not accept this view but considers that the gland is itself controlled by a higher centre, the genital centre situated in the medulla. If the genital centre is undeveloped or diseased, it fails to stimulate the pituitary to produce prolan, puberty does not occur and sexual infantilism is the result. Similarly, the early appearance of puberty is primarily due to activity of the genital centre at too early an age. Cases of premature sexual senility, however, are due to a variety of causes. It may happen that the genital centre and the pituitary gland are normal whilst the gonads themselves are functionless, but it may also be due to failure of the genital centre. There is as yet, however, no means of discovering an inactive genital centre.

Recent work has shown that the posterior lobe of the pituitary is intimately associated with certain diseases incidental to reproduction, e.g. eclampsia. This disease in human beings is due to a hypersecretion of the posterior lobe of the pituitary and, as the symptoms and pathological changes seen in eclampsia in animals are so similar to those seen in human beings, it is safe to assume that the cause is the same. Pituitrin undoubtedly induces relaxation of the pelvic ligaments and uterine contractions, but the uterus also receives sympathetic and parasympathetic nerves. These supply the body and the cervix respectively and ensure that

when the uterine wall is actively contracting the cervix will be relaxed and *vice versa.*

Evidence has been obtained that ovarian cystic degeneration is the result not only of an abnormal activity on the part of the anterior pituitary but also of over-activity of the parasympathetic nerves. Parasympathetic overactivity, or rather lack of sympathetic control, also occurs in milk fever. Here, since the electrolytes of the body are closely associated with the proper functioning of the autonomic nervous system, a calcium deficiency has depressed the sympathetic system and thus allowed the parasympathetic nerves to exert increased effects which produce the typical symptoms of milk fever.—J. A. NICHOLSON.

TAGLIAVINI, A. (1935). Di alcune alterazioni dell'ovaio della cavalla. [**Changes in the Ovary of the Mare**].—*Profilassi.* **8.** 132-137. 3 figs. [6 refs.] [English and French summaries : abst. from orig.]

Abnormal genital organs from 30 mares have been examined, particular attention being paid to the ovaries. Atresia of the follicles followed by cystic degeneration was the most frequent lesion observed. In the majority of cases both ovaries were affected but sometimes follicular atresia was found in one ovary only ; in these cases, however, regressive changes were usually present in the corpus luteum of the other ovary. The cystic degeneration which follows atresia of the follicles is usually multiple and when multiple cysts are present they are never prominent on the surface of the ovary. Cysts may also arise in the ovary from degeneration of a persistent corpus luteum. In the majority of cases where ovarian changes were present, a leucocytic infiltration of the endometrium was also found. The uterine mucosa usually showed zones of hyalin degeneration and many eosinophiles were present in the lumen of the vessels. In two cases in which large cysts were present in the ovary, the endometrium was infiltrated with neutrophile leucocytes.

The author concludes that there is a correlation between ovarian and uterine lesions and that the follicular atresia and cystic degeneration, frequently seen in the ovaries of mares, are the result of an ascending infection of the uterus. The abnormal stimuli set up in the uterus cause follicular hyperactivity which is followed by disturbances in the endocrine functions of the ovaries.—J. A. N.

PHILLIPS, R. W., & MCKENZIE, F. F. (1934). **The Thermo-Regulatory Function and Mechanism of the Scrotum.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 217. pp. 73. 31 figs., 27 tables. [26 refs.]

A detailed investigation was carried out on rams, guinea pigs and rats in order to study the effects of various temperatures on the histological structure of the testes and spermatozoa.

It was first found that in healthy rams at the breeding season the cutaneous temperature of the scrotum was 6·5°C., and that of the centre of the testes 4·9°C. below the normal rectal temperature. After insulating the scrotum by enclosing it in a bag of woollen material it was found that in four days degeneration of the germinal epithelium had begun : this increased in degree with the duration of insulation, the maximum time under observation being 16 weeks, at which period the degeneration was far advanced. Spermatozoa obtained during the insulation period showed corresponding changes, represented by an increase in abnormal types (coiled tails, tailless heads, etc.) proportional to the duration of insulation.

The removal of the insulating bag resulted in regeneration of the germinal epithelium.

This work shows that testicular development and function can only occur at

a temperature below that of the body (other workers support this conclusion after observing the result of placing normal descended testes in the abdominal cavity), and it is suggested that testicular grafts must be made into the scrotum in order to develop, otherwise they will be too warm to grow if placed in the body.

Further research clearly showed the thermo-regulatory function of the tunica dartos muscle which retracts or releases the testes as the external temperature varies.

Mention is also made of the improvement in fertility in two rams after excessive wool on the hind limbs and abdomen had been removed.—J. E.

MARTENSSON, J. (1935). Erfarenheter av biologisk dräktighetsdiagnostik å ston 1934. [**Report of Pregnancy Diagnosis Work on Mares in Sweden in 1934**]. —*Skand. VetTidskr.* **25.** 544-550. 1 table. [3 refs.] [English summary: abst. from orig.]

The Friedmann-Schneider biological method of pregnancy diagnosis proved to be reliable in 88 per cent. of cases on a series of 102 mares tested between the 49th and 84th days of gestation. [See also this *Bull.* **4.** 782].—J. E.

I. MILLER, W. C. (1934). **Biological Methods of Diagnosing Equine Pregnancy. I. The Mouse Test.**—*Proc. roy. Soc. Ser. B.* **116.** 237-246. 2 tables. [12 refs.]

II. GREENWOOD, A. W., & BLYTH, J. S. S. (1934). **Biological Methods of Diagnosing Equine Pregnancy. II. The Capon Test.**—*Ibid.* 247-258. 8 figs., 1 table. [18 refs.]

I. The diagnosis of pregnancy in mares depends upon the demonstration of oestrin in their urine and, in the test described, this substance is recognized by the reaction caused by the injection of urine samples into mice. Samples of urine possess excellent keeping properties and no special measures are required save in cases where the urine is sent long distances, e.g. from India, in which case each sample should have a toluol seal.

The mice used for the test are oöphorectomized when three or four weeks old, and the first injections are given three weeks later. To reduce the mortality amongst the test mice, alkaline urine is acidified with sulpho-salicylic acid, neutralized and filtered before injection. Since the amount of oestrin in the urine increases rapidly during pregnancy, mares are divided into three classes according to the duration of pregnancy, when the urine sample was collected and the amount of urine, the number of injections given to the test mice varying accordingly. Thirty-six hours after the last injection vaginal smears are obtained from the test mice and stained with Giemsa which stains cornified cells a brilliant blue. If the cells are characteristic of those normally present at oestrus the result is positive; if the cells are characteristic of a normal dioestrus the result is negative. The error of the test is 1·08 per cent.

II. The female Brown Leghorn possesses salmon-coloured breast feathers whilst these are black in the male, and it has been shown that the characteristic female plumage is produced and maintained by the ovary whereas the male plumage is neutral in type and is unaffected by the testis. It has also been shown that a single injection of oestrin into Brown Leghorn capons produces a change in colour of the growing breast feathers in 48 hours and this fact forms the basis of the test here described. Once feathers become pigmented they are unaffected by oestrin and capons are used for the test as they have the faculty of rapidly renewing plucked feathers.

About a dozen feathers are removed from the breast and about seven days

later, when young growing feathers can be seen pressing the skin outwards, 10 c.c. of prepared urine is injected into the pectoral muscles on two consecutive days. Three days later a few feathers are removed for microscopic examination. If the urine contains oestrin, red pigment is present at the base of the feathers. The results so far obtained agree very closely with those given by the mouse test. A few weakly positive reactions have been obtained, but these do not indicate pregnancy; in these cases the urine sample was probably taken during oestrus.

The Sebright is the only other race of fowls which has been used for the test, but a study of the plumage development in these birds indicates that the thyroid gland also exercises some effect on the type of plumage produced. This, however, is not the case in Brown Leghorns and these birds are the most suitable with which to work.—J. A. NICHOLSON.

OLSON, C., Jr., & MANN, F. C. (1935). **The Physiology of the Cecum of the Domestic Fowl.**—*J. Amer. vet. med. Ass.* **87.** 151-159. 1 table. [15 refs.]

From previous work it has been concluded that there is a hydrolyzing ferment which attacks starch and an invertase of saccharose in the caecal secretion. Opinions have been expressed that a proteolytic enzyme which was somewhat similar to trypsin in man was also present. No action of the caecal secretions on fats could be demonstrated.

Little is definitely known concerning the physiological mechanism of the filling and emptying of the caecum of the fowl. It has been stated that the peristaltic activity of the caecum is responsible for the filling of the organ by exerting a sucking action; further, that only fluids may enter the caecum and that their entrance into the organ is dependent on the dilution and quantity of such fluids.

Experiments were carried out by the authors using 75 adult fowls. The pH concentrations of samples of the gastro-intestinal contents were determined by the quinhydrone gold electrode technique. The pH values of the caecum were observed to be lower than those of either the preceding or succeeding portions of the intestine.

Studying the filling of the caecum, carmine, rose bengal, trypan blue and hydrokollog, a colloidal carbon, mixed with dry food could be detected in the caecum 24 to 48 hours after the birds had been fed. Lamp black, when mixed with the food, did not gain entrance to the caecum in any appreciable amount, even when fed for a period of two weeks.

The caeca were found to empty themselves of carmine and rose bengal, which entered the organs after having been ingested with the food, 120 hours after the cessation of feeding the dyes.—NORMAN DOBSON.

MEIGS, E. B., TURNER, W. A., KANE, E. A., & SHINN, L. A. (1935). **The Effects, on Calcium and Phosphorus Metabolism in Dairy Cows, of Feeding Low-Calcium Rations for Long Periods.**—*J. agric. Res.* **51.** 1-26. 19 tables. [Numerous refs.]

The Ca and P intake in the food of cows and the output through the milk and in the course of nourishing the calf *in utero* were determined for periods of from one to six years. At the end of that time the animals were slaughtered and the Ca and P were determined in the whole body, the bones and the soft tissues. In addition balance experiments were carried out on three cows which had been previously on a low calcium diet. There is reason to believe that cows may readily assimilate 40 to 60 per cent. of the Ca intake when they are kept on low Ca rations for long periods. After several years on a daily intake of 25 g. of calcium, the Ca content of the fat-free bodies of the dairy cow is not likely

to be reduced below 85 per cent. of the normal, and the Ca/P ratio remains practically unchanged. The authors found no evidence to support the view that cows, fed with either a high or a low Ca intake, stored Ca and P in proportions different from those usually found in the body. It is suggested that contrary results found previously have been due to the experiments being of too short a duration. Some evidence is deduced to show that the failure in general health and reproductive efficiency which accompanied the feeding of dairy cows with poor qualities of hay was more likely to be due to a deficiency of vitamin A than to a deficiency in calcium.—HENRY DYRERRE.

SCHMIDT, C. L. A., & GREENBERG, D. M. (1935). **Occurrence, Transport and Regulations of Calcium, Magnesium and Phosphorus in the Animal Organism.**—*Physiol. Rev.* **15.** 297-434. 13 tables. [16 pp. refs.]

So many reviews of the literature appertaining to this subject have been written of late years that the authors of the present article have confined their attention to directing readers to the main avenues along which research is progressing at the moment, and to the conclusions which so far can be drawn from those lines of research. The first section deals with the sources, requirements and absorption of calcium, magnesium and phosphorus. It is pointed out that, of these three minerals, the limiting factor for herbivorous animals under natural conditions is phosphorus, but that under artificial conditions, on rations of grain and their by-products, there may be an excess of phosphorus but a lack of calcium. The form in which these elements occur in natural foodstuffs is for the greater part determined by the reaction. From the standpoint of absorption and utilization, the mode of combination is important, and this is especially true of phosphorus which can be present in such a variety of organic salts. The quantitative requirements of the animal organism for these minerals is discussed, and their availability in various diets noted. The literature dealing with the parts played by the ratio between the elements, the reaction of the alimentary tract, vitamin D, bile and the parathyroid gland in the absorption of these elements is well reviewed.

The fate of calcium, phosphorus and magnesium in the blood stream and body fluids, and their presence in tissues and the skeleton is thoroughly explored in the second section. In this connexion the state of blood calcium, including the nature of the diffusible and non-diffusible fractions, and the chemistry of the magnesium and phosphorus blood compounds are examined.

The third section, which is of the greatest importance to clinical pathologists, deals with the physiological and pathological variation of the minerals in the blood. The normal ranges, quoted from many authors, are given and discussed. Disturbances in calcium, phosphorus and magnesium metabolism have been postulated in many pathological conditions, but the evidence offered in many cases is very doubtful and the authors mention epilepsy, tuberculosis, neoplasms, essential hypertension, polycythemia vera, jaundice and allergies of various types as examples of such diseases. The influence of vitamin D on the elements is considered in reviewing rickets, osteomalacia and hypervitaminosis D. The relationship of the endocrine glands to the metabolism of calcium, phosphorus and magnesium is discussed in another section where the interrelationship of the parathyroid hormone and vitamin D is shown. The behaviour of the elements during tetany has been investigated at length and the more important findings are detailed in this paper. The difficulty of a clear understanding of the metabolism of calcium, phosphorus and magnesium is realized on reading the section on the excretion of those minerals since, unfortunately, the amount of those three elements which appear in each of the excretory channels does not constitute an index of either endogenous or

exogenous metabolism, as excretion takes place both in the urine and intestines. The various factors which influence these excretions are discussed. This excellent review has appended a bibliography extending to over 15 pages, which the authors call incomplete, but which most workers will find more than sufficient to obtain a ready access to the literature.—JAMES STEWART.

COVINGTON, N. G. (1935). **The Significance of Traumatized Tissue Response to the Ultraviolet Rays.**—*J. Amer. vet. med. Ass.* **86.** 135-147. 2 figs., 6 tables.

The action of a Burdick quartz-mercury arc lamp emitting ultra-violet rays was tested on dogs. No erythema of the skin could be produced, even after exposure for 15 minutes at a distance of 17 to 30 inches, unless the hair was first removed. Hairless skin reacted by showing various degrees of erythema. Tolerance develops to therapeutic doses.

Controlled groups of dogs were then subjected to a long incision of the abdominal wall including the muscular coat ; the wound was further traumatized by rough manipulation and was treated to three minutes' dosage of ultra-violet light at 15 inches, sutured without attention to asepsis and irradiated again for one minute.

Other dogs were splenectomized (asepsis disregarded), the incised parts were irradiated and the wound was sutured. The wounds of all irradiated dogs healed by first intention whilst those of the non-irradiated controls suppurated without exception. The healing and bacteriostatic actions of ultra-violet light were thus plainly demonstrated.—J. E.

TECHNIQUE.

ROSENOW, E. C. (1935). **A New Method of Staining Bacteria and its Application to a Study of Streptococci and the Viruses of Poliomyelitis and Encephalitis.** —*J. Bact.* **29.** 40-41.

Thoroughly fixed films were stained with a basic dye such as methyl violet, washed with water, treated successively with Gram's iodine and 2 per cent. " safranine " and then washed and examined. Films prepared by this method revealed the presence of delicate oval cocci and diplococci in filtrates of brains and cords of persons who had died of acute poliomyelitis and of experimental animals fatally infected with the viruses of poliomyelitis, epidemic encephalitis and herpes encephalitis, and with the streptococci associated with these conditions. Direct films from the spinal fluid of such affected persons or animals and films made from filtrates of cultures of these streptococci showed similar cocci. Films from control filtrates and spinal fluids were negative.—A. BROWNLEE.

PIJPER, A. (1935). **On Measuring Red Blood-Cells, with Special Reference to a New Diffraction Apparatus.**—*Lancet.* **228.** 1152-1154. 2 figs., 1 table. [11 refs.]

The author describes an apparatus by which, from the size of the diffraction rings obtained from the R.B.C., the diameter of the cells can be calculated. A different diffraction pattern is obtained from each of the various types of anaemia, and the author claims that a diagnosis can be made from measurements of the coloured rings.—G. D. SHEARER.

BRÜGGEMANN, J. (1935). Ueber eine Methode zur Registrierung der Magenbewegungen beim kleinen Wiederkäuer. [**A Method for Registering the**

Stomach Movements of Small Ruminants].—*Arch. wiss. prakt. Tierheilk.* **69.** 296-298. 2 figs. [5 refs.]

Brüggemann describes a simple apparatus which he has constructed for measuring the movements of the fore and true stomachs of small ruminants. A sketch, which is self-explanatory, is given of the apparatus, together with a tracing of the movements of the rumen and abomasum. The author states that the apparatus can be adapted to register the muscular movements of other organs, e.g. the uterus.—G. Dods Munro.

Wagener, K. (1935). Die Konservierungsmöglichkeit von Lungenschleimproben während des Tierversuches im Rindertuberkulosebekämpfungsverfahren. [**The Preservation of Lung Mucus Samples during the Guinea Pig Test for Tuberculosis**].—*Tierärztl. Rdsch.* **41.** 561-564. 3 tables.

In view of the fact that guinea pigs inoculated with suspected material often die too early for a definite diagnosis to be reached, Wagener compared the value of a series of 14 agents in preserving the material so that a further test may be carried out. Two series of experiments were first carried out with tubercle bacilli from cultures. Various dyes, e.g. malachite green, brilliant green and gentian violet, each in a concentration of 0·2 : 1,000, gave good results. A third series made with bronchial mucus showed no difference between malachite green 0·2 : 1,000 and normal saline. A fourth series, consisting of 155 samples in which tubercle bacilli were not recognizable microscopically, was preserved with 0·2 : 1,000 malachite green, put in the cold and tested after 40 to 90 days. The author concludes that 81 per cent. of samples which were positive originally were also positive after several weeks' storage with malachite green.—A. W. Stableforth.

Hoffmann, H., & Dehmel, H. (1935). Ueber die Prüfung von Desinfektionsmitteln mit der Deckglasmethode nach Jensen. [**The Testing of Disinfectants by Jensen's Cover-Glass Method**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 182-186. 2 tables. [3 refs.]

The authors have examined the technique for standardizing disinfectants proposed by Jensen and Jensen [see this *Bull.* **4.** 676]. They consider the method to be extremely valuable and worthy of general adoption. One point particularly in favour of this test is that only one variable factor features in the reaction, namely the dilution of the disinfectant.—E. J. Pullinger.

Ohyama, S. (1935). Microdosage du formol. [**Micro-Estimation of Formaldehyde**].—*Jap. J. exp. Med.* **13.** 327-330. 1 fig. [2 refs.] [In French].

A new colorimetric method is described for the estimation of small quantities of formaldehyde, based upon precipitation with " trypaflavine " in the presence of hydrochloric acid and subsequent treatment with potassium nitrite.—H. H. Green.

MISCELLANEOUS.

Moussu. (1935). Sur l'élevage colonial. [**Animal Husbandry in the French Colonies**].—*C. R. Acad. Agric. Fr.* **21.** 456-464.

The author discusses the development of meat production in the French colonies and its probable influence on the meat trade in France. The French meat producer is suffering because there is too great a difference between the price of slaughter cattle and the price of meat to the public, the latter being so high that it restricts consumption. Turning to the colonies, it is argued that North Africa is too dry to produce large cattle suitable for slaughter, but it is suitable for sheep,

although in Algeria there was a decrease from eight million to five million sheep between 1913 and 1933 on account of drought. North Africa still imports from France and her supplies are not likely to exceed her own needs. Since 1916 French West Africa has recorded a decrease of three million cattle and an increase of two million sheep, the loss of cattle being ascribed to rinderpest and war requirements. After this loss has been recovered, some areas of West Africa may provide surplus stock, but this should all be absorbed by neighbouring territories, e.g. the Gold Coast and Nigeria. Madagascar has a large potential meat supply, and it is suggested that this should be developed to replace the refrigerated meat from Australia and America. It is argued that this imported meat should not affect the market for home produce, and England is cited as an example of a country which imports large quantities of meat without depressing the market for the home-killed article.—U. F. Richardson.

Kasper, K. (1935). Les services vétérinaires de l'Autriche. **[The Austrian Veterinary Services].**—*Bull. Off. internat. Epiz.* **9.** 578-586.

The Austrian Public Health Act of 1909 aims at the control of foot and mouth disease, anthrax, blackleg, rinderpest, glanders, sheep pox, dourine, vesicular exanthema of horses and bovines, mange, rabies, haemorrhagic septicaemia in pigs, swine erysipelas, fowl cholera, fowl plague and clinically diagnosable bovine tuberculosis. The Federal Ministry of Agriculture has added furunculosis of fish, and certain contagious diseases of bees to the schedule of notifiable diseases. The veterinary staff controls the transport of animals, inspects markets, sales-yards, live animals and meat, and controls the disposal of carcasses. Compensation is given by the Treasury.

Rinderpest was eradicated in 1880, and pleuro-pneumonia in 1914. In 1924, the order imposing a general uniform veterinary inspection of all meat was introduced.

The veterinary service is directed by the author who is responsible to the Minister of Agriculture. Each province of the federation has its veterinary section with an independent head, and district veterinary surgeons are appointed for provinces and for the more important towns. The district veterinarians attend to questions of breeding, treatment of disease and vaccinations, and the municipal veterinarians control abattoirs and meat inspection.

The federal institute at Mödling provides all the necessary vaccines and sera and undertakes the diagnosis of contagious disease.

By agreement with surrounding countries, veterinary control of animal transport secures protection against the introduction of contagious diseases. Particular attention is being paid to the prophylaxis of bovine tuberculosis and the campaign against this disease will recommence as soon as the financial position of the country is improved.—F. Bullock.

Boes, J. (1935). La police sanitaire en Belgique depuis 1930. **[Veterinary Services in Belgium since 1930].**—*Bull. Off. internat. Epiz.* **9.** 754-768. 6 tables. [7 refs.]

J. Boes, Chief of the Veterinary Department in Belgium, has given a useful résumé of the veterinary services in his country from the year 1784, when the first decree was made, followed by others in 1791, 1810, 1845, 1866, 1877, 1882, 1890 and 1922.

Until 1910, the service was under the control of the Minister of the Interior, and was then transferred to the Minister of Agriculture, with the exception of meat inspection and control of rabies.

Before 1850, the art of treating sick animals could be exercised by any person furnished with a " patente ", such " patente " being obtained by proving practical knowledge before a jury constituted for the purpose of awarding decisions.

In 1855, there existed 349 qualified veterinary surgeons, of whom 192 were in the service of the government, 28 in the army and 129 in private practice. In addition there were 239 " marechaux vétérinaires " (really farriers) in practice ; the latter, like the registered practitioners in England, gradually diminished and ceased to exist in 1910. In 1850, only veterinarians holding a diploma were allowed to deal with contagious diseases ; these were recruited by the government, and the Minister of the Interior fixed their places of residence and the district over which they had control. Their duties were to control contagious diseases, survey the sanitary conditions of the premises of breeders and feeders of animals, examine all suspected animals and attend all markets and fairs.

Before 1882, the principal contagious diseases controlled were glanders and contagious bovine pleuro-pneumonia. In 1880 there were recorded 508 cases of glanders and 1,718 cases of contagious bovine pleuro-pneumonia. Rinderpest was prevalent in the years 1865 to 1868 and again after the Franco-Prussian War, 1870 to 1872 ; from 1870 to 1873, 124,265 francs were paid as indemnities to owners of slaughtered animals. This sum was considered small and entirely due to good veterinary control, especially when compared with the loss of 400,000 animals in England during the same period.

In 1922, the diseases designated as notifiable included glanders and farcy, dourine, epizootic lymphangitis, contagious bovine pleuro-pneumonia, sheep scab, sheep pox, swine fever, rabies, foot and mouth disease, rinderpest and anthrax.

It is noteworthy that as early as 1897 regulations were framed to deal with tuberculosis with further amendments in 1927. In 1924, a series of measures for the control of warble flies was introduced, and the importation of livestock was placed under government control with power to enforce quarantine detention and testing with tuberculin and mallein. Power was given to the Minister of Agriculture to destroy animals affected with foot and mouth disease and swine fever, and also to indemnify owners for loss due to anthrax and tuberculosis. A table is given showing indemnities paid from 1881 to 1929. The government issues gratuitously serums and vaccines against anthrax, blackleg and epizootic abortion, and also tuberculin and mallein.

In 1925, a Government Veterinary Laboratory was created which has done good work. All veterinarians may apply to the government for approval as fit to take part in veterinary police work in connexion with contagious diseases of animals.

The supervision over domesticated animals, including the inspection of meat, is entrusted to veterinary inspectors, assisted by one or more private practitioners called in when required.

The whole service is under the control of an Inspector General. The country is divided into 17 districts, each in charge of a veterinary inspector with a special inspector at the port of Antwerp. The government veterinary inspectors are approved by the king, and private practice is forbidden. They report to the Minister of Agriculture, control disinfection of wagons, knackeries and abattoirs, supervise regulations with regard to meat and milk production, address farmers and assist them with information to control contagious diseases of animals. There are six ports under control :– Antwerp, Ghent, Bruges, Zeebrugge, Ostend and Brussels. At 20 places on the frontiers there are quarantine stations for imported animals. Contagious bovine pleuro-pneumonia has been eradicated since 1896. Glanders and rabies may be considered as completely conquered and anthrax greatly diminished. In July 1920, a severe test was made of the efficiency of the service by an outbreak

of rinderpest caused by the transport of 275 zebus from Bombay en route to Brazil. The disease was stamped out by the end of November, during which time 279 animals died and 490 affected animals were killed, as well as 1,859 in-contacts. This total of 2,628 animals cost three million francs, but the money was considered well spent as, if not checked by good veterinary service, the disease might have spread all over Europe.—T. DUNLOP YOUNG.

EGANA, C. S. (1935). Noticias acerca de los planes de la enseñanza veterinaria. [**History of Veterinary Education in Spain**].—*An. Esc. sup. Vet. Madrid. 1935.* pp. 169-183. [12 refs.]

After explaining how BOURGELAT founded at Lyon the first veterinary school in 1764, to be followed by that at Alfort in 1765, the author states that Bernado RODRIGUEZ was sent by the Spanish government to Alfort in 1776, and that on his return to Spain after qualifying in 1777 he at once began to urge the establishment of a veterinary school in Spain, but nothing was done. Later, in 1787, two other Spanish veterinarians, MALATS and ESTEVEZ, took their diplomas at Alfort and in 1788 MALATS, who had visited England and Italy, was authorized to form a veterinary school at Madrid with ESTEVEZ as assistant. The school was actually established in 1792. Extracts from contemporary documents are given showing how the school developed and how the instruction was extended. In 1827 the course was fixed at five years, and in 1847 two other schools were established at Cordova and Saragossa. The syllabus was again revised in 1854, 1857 and 1871, and finally in 1912 when bacteriology and parasitology were added. The course follows the usual curriculum, but the first year includes mathematics and German in addition to the pure science subjects, and German is continued throughout the course. A sixth year may be spent preparing for the doctorate.—F. BULLOCK.

—. (1935). Sverige. Lag om bekämpande av smittosamma husdjurssjukdomar (epizootilag); den 12 april 1935. [**Sweden: Law on Control of Infectious Animal Diseases, April 1935**].—*Skand. VetTidskr.* **25.** 555-557.

The following diseases are declared notifiable and instructions for their control are given to stock-owners, veterinary inspectors and police authorities :– foot and mouth disease, rinderpest, contagious bovine pleuro-pneumonia, swine fever, glanders, rabies, sheep scab, anthrax, blackleg, mange in horses or cattle, fowl plague, fowl cholera, and infectious abortion of mares.—J. E.

HESLOP, G. G. (1935). **The Duties of Veterinary Surgeons in Relation to Racing.** —*Aust. vet. J.* **11.** 22-27. [1 ref.]

The principal duties of a veterinary surgeon appointed to a race club are to give advice when required on all matters relating to the health and fitness of horses competing and to render first aid in case of injury. He also has to deal with suspected instances of doping. Heroin and cocaine, which are the principal drugs used for doping horses, can usually be detected by analysis of saliva taken during the first 36 to 48 hours after the onset of excitement. Veterinarians should take care that when alkaloids are prescribed for racehorses their administration ceases at least three days before the horse races, as otherwise such alkaloid might be demonstrated in the saliva and lead to the assumption that the horse had been doped.—W. I. B. BEVERIDGE.

I. BLACKWOOD, J. H. (1935). **Biennial Reviews of the Progress of Dairy Science. Section A. Physiology of Dairy Cattle. I. Reproduction and Lactation.**—*J. Dairy Res.* **6.** 252-260. [108 refs.]

II. Morris, S. (1935). **Biennial Reviews of the Progress of Dairy Science. Section A. Physiology of Dairy Cattle. II. Nutrition.**—*Ibid.* 260-271. [107 refs.]

III. Smith, A. D. B. (1935). **Biennial Reviews of the Progress of Dairy Science. Section A. Physiology of Dairy Cattle. III. Genetics.**—*Ibid.* 272-281. [65 refs.]

I. Reproduction and lactation were discussed under the headings :– hormones ; biochemical aspects ; biophysical aspects ; clinical chemistry of dairy cattle, and factors affecting milk yield and composition.

II. The section on nutrition deals with saliva, the physiology of rumination and digestion, energy metabolism, protein and mineral metabolism and feeding experiments.

III. The section on genetics has a general introduction and has reviews on conformation, pedigree, breed construction, inbreeding and the progeny test. —J. E.

Eickmann, & Schopen. (1935). Lässt sich das mit einer Schraube versehene Stilett zur Trachealkanüle nach Scharr durch Abwaschen, Abreiben und nachfolgendes Abflammen mit Alkohol einwandfrei sterilisieren ? **[Can Scharr's Universal Tracheal Canula be Properly Disinfected ?]**—*Dtsch. tierärztl. Wschr.* **43.** 73-75 and 93-94. 1 fig. [1 ref.]

The authors state that Scharr's universal tracheal canula and stilette used for obtaining bronchial mucus from cattle suspected to be tuberculous [this *Bull.* **4.** 137.] can be reliably disinfected by washing in hot 2 per cent. soda solution, and drying and dipping in spirit which is ignited.

This method is based on laboratory tests in which the instruments were artificially infected, subjected to a disinfection treatment and then used [in a manner not quite clear] to infect guinea pigs.—J. E.

Balloni, A. (1935). Sull'esistenza e sul comportamento del " fenomeno di ostacolo " nell'urina degli animali. **[Donaggio's Chemical Urine Test in Animal Pathology]**.—*Nuovo Ercol.* **40.** 115-126. [47 refs.]

It has been found that certain urine prevents the precipitation of basic analine salts, such as thionin, by ammonium sulphate and it has become apparent that this property is due to the presence of abnormal colloidal substances. The colloid is not removed from the urine by dialysis but, when such urine is treated with kaolin or animal charcoal, it looses its power of preventing the precipitation of thionin by ammonium molybdate.

The author carried out a series of experiments with urine from normal animals and from dogs, cats, pigs, horses and cattle suffering from a variety of diseases. Urine from normal animals and from those suffering from diseases of the skin and chronic afebrile tuberculosis did not prevent precipitation, whereas urine from animals suffering from acute infectious diseases, nervous disturbances and excessive muscular fatigue prevented precipitation.—J. A. Nicholson.

Valade. (1935). La météoro-pathologie. **[The Effect of Climate on Disease]**. —*Rev. vét. milit.* **19.** 161-180. [26 refs.]

This paper, which is in two parts, is a study of the influence of atmospheric conditions and of soil on disease. The first part deals with the relationship of barometric pressure, altitude, heat, light, humidity, rain, fog, winds and seasonal changes to the incidence of certain pathological conditions and the development of epizootics. The whole subject is thoroughly reviewed, but no new material

is introduced. There is a reference to the part played by fog in the peculiar outbreak of fatal cases in animals which occurred in the Meuse valley of Belgium in 1930 [see this *Bull.* **1.** 176.].

The second part deals with soil in relationship to disease causation, special attention being given to nutritional diseases, anthrax and cancer.—C. DAVENPORT.

GWATKIN, R. D. S. (1933). **Dogs and Human Migrations.**—*J. S. Afr. vet. med. Ass.* **4.** 154-165 and 223-225, and **5.** 29-40. 3 figs.

In this article Gwatkin traces the association of the dog with man from the earliest times. The origin of domestic dogs is discussed and reference made to the most ancient domesticated dog, *Canis palustris*, followed by descriptions of the second, third, and fourth dog types of antiquity. In conclusion a description is given of a dog species which entered Africa from Asia and is now known as the Rhodesian Ridgeback dog.—E. M. ROBINSON.

VELU, H. (1935). La guerre microbienne est-elle réalisable ? [**The Possibilities of Bacterial Warfare**].—*Maroc méd.* March 15th. 108-114 and Apr. 15th. 153-161. [16 refs.]

In this paper the author advances his personal views as a laboratory worker on the possibilities and probabilities of the use of pathogenic micro-organisms as a weapon in future warfare. The paper, which is of some length, consists of a detailed study of the question. The legal and moral aspects are first considered and dismissed as unlikely to have any bearing on the case. Instances are quoted of resort to disease dissemination in previous wars, special attention being given to the war of 1914 to 1918. In this connexion MARCENAC's original communication on the subject is freely quoted [see this *Bull.* **5.** 244].

Future possibilities are next dealt with. Examples are given of planned dissemination of disease in the realm of economics as a means of exterminating animal and vegetable pests, viz. rats, rabbits, locusts, etc. The author then enumerates the organisms which might be utilized to render men and animals ineffective in war. As far as animal diseases are concerned, glanders, anthrax, tetanus, foot and mouth disease, rinderpest and contagious bovine pleuro-pneumonia are mentioned as possibilities, as well as certain diseases communicable from animals to man such as undulant fever, tularaemia, melioidosis and psittacosis. War factors likely to facilitate spread of disease in epizootic form are then considered. A detailed account is given of the outbreak of rinderpest in France and Belgium in 1920 and the difficulties which were then encountered in getting machinery for control in operation. It is emphasized that such a problem would assume an even more serious aspect in time of war.

The remainder of the paper is chiefly of military interest and is devoted to the probable means which would be adopted for the dissemination of disease in war, an account of the sequence of events in the next war as envisaged by the author, and finally the measures which ought to be instituted at once to train the army and civil population to meet this menace.—C. DAVENPORT.

THOMSEN, M. (1935). Ueber die Organisation der angewandten Entomologie in Dänemark. [**On the Organization of Applied Entomology in Denmark**].—*Arb. physiol. angew. Ent. Berl.* **2.** 52-55.

Active control of warble flies in Denmark has resulted in a fall in the number of cattle hides damaged by these insects from 23 per cent. in 1922 to 4 per cent. in 1924, and this percentage has remained low, being 3 in 1932. Other activities having no veterinary bearing are also discussed.—E. J. PULLINGER.

OFFICIAL AND OTHER REPORTS.

GREAT BRITAIN. (1934). **Report of Proceedings under the Diseases of Animals Acts for the Year 1933, Ministry of Agriculture and Fisheries.** [KELLAND, P. J. L.] pp. 114. 24 tables, 6 appendixes. [15 refs.] London : H.M. Stat. Off. [8vo] [2s.]

Part I of the report deals with the position in Great Britain with regard to contagious diseases of animals ; the list of notifiable diseases remains unchanged. Statistical tables are included in Appendix I showing the distribution of diseases in each county of Great Britain.

There were 87 outbreaks of foot and mouth disease during the year, the large majority of which occurred within two widely separate periods, namely the first quarter of the year (54 outbreaks) and October (22 outbreaks). No outbreak occurred in any part of Great Britain after the 31st October. There were 31 new centres of infection in 1933 and full particulars of these are given. During the year 19 initial or " parent " outbreaks occurred in regard to which no connexion with any other centre of disease could be traced ; in none of these was the original source of infection definitely identified.

According to the returns furnished by the local authorities, tuberculosis in one or other of the forms referred to in the Tuberculosis Order of 1925 was reported to exist on 23,608 premises in Great Britain during 1933 as compared with 22,014 premises in 1932. The number of animals examined by veterinary inspectors rose from 302,354 in 1932 to 350,550 in 1933. As the result of these examinations, 21,085 were reported by inspectors as coming within the scope of the Order. Of these 20,908 were slaughtered by local authorities and the total sum paid as compensation was £71,826, an average of £3 8s. 8d. per head. The numbers of affected animals in the four categories were :– (a) cows giving tuberculous milk 661 ; (b) cows with tuberculosis of the udder 3,109 ; (c) bovine animals with tuberculous emaciation 8,028, and (d) bovine animals with a chronic cough with clinical signs of tuberculosis 9,287.

There were 578 outbreaks of sheep scab in Great Britain during the year ; the distribution of the disease is carefully described in the report, special consideration being given to the large increase in the number of outbreaks in the counties bordering the Pennine Range, and to measures adopted to deal with the situation. During the year, 11 sheep dips were approved for use under the Orders of the Minister relating to sheep scab and sheep dipping. The areas to which Parts II and III of the Sheep Scab Order of 1928 were applied are described.

Swine fever showed a slight decrease, the number of suspected outbreaks reported being 11,036; of these 1,414 were confirmed as against 1,555 in 1932. Enquiries showed that 261 outbreaks were due to market infection or to infection during conveyance to or from markets ; in 752 outbreaks the affected swine had recently passed through a market and may thus have become infected.

During 1933, 297 outbreaks of anthrax were confirmed as compared with 344 in 1932. A table showing probable origins of disease is given.

There were 132 outbreaks of parasitic mange of equines involving 38 counties during the year as compared with 127 outbreaks in 36 counties in 1932.

Part II deals with the subject of importation with regard to preventing the introduction of contagious diseases of animals into Great Britain. In Appendix II an up-to-date summary is included of the effect of the regulations controlling the importation of cattle, sheep and goats, other ruminating animals and swine, horses, asses and mules, and dogs, cats and other canine and feline animals, in addition to the importation of fresh carcasses and of hay and straw.

Part III deals with the protection of animals during transit and exportation of horses, and Part IV with the export of pedigree and other stock and of raw animal products under the regulations of the importing countries. Canada appears for the first time in the table of Dominions and Colonies, etc., to which stock was exported through the Quarantine Station, East India Dock, London; New Zealand still maintained the prohibition against stock from Great Britain.

The work of the Veterinary Laboratory is reviewed in Part V. 454 specimens were received for anthrax diagnosis; 421 were from bovines, of which 335 proved positive; 8 were from horses, 5 being positive; 19 were from pigs, 4 being positive and 6 from sheep, 1 being positive. 23,581 doses of vaccine were supplied to veterinary surgeons for the inoculation of animals in herds affected with epizootic abortion. The preparation of BCG vaccine against tuberculosis was continued and 1,392 doses were issued. A résumé of research work carried out and papers issued during the year is given in this section.—J. C. Wallace.

Scotland. (1935). **The Hannah Dairy Research Institute. Annual Report for the Year ending 31st March, 1935.** [Wright, N. C.] pp. 16. 4 figs. on 2 plates. Glasgow: Aird & Coghill, Ltd. [8vo].

The sixth annual report of the Institute is presented as a booklet of 16 pages, the first few of which are devoted to a brief account of its history and organization. The staff are engaged on research work into a wide range of problems connected with the dairy industry, and during the year under review there has been an increasing demand for their services.

In a herd of pedigree Ayrshire cattle, maintained at the Institute's farm under conditions of management and economic lines which are not beyond the means of the average dairy farmer, breeding experiments are carried out with a view to determining the value of a proven sire. The herd is free from tuberculosis and contagious abortion.

The work done, which is of interest to readers of this *Bulletin*, is the following:—

The Biochemistry of Milk Secretion.—Studies have been continued on the way in which the digested food constituents are transported to the mammary glands and transformed into milk. Interesting observations have been made on the factors which are responsible for variations in the composition of the blood of the mammary and jugular veins; it has been found that salivary secretion may have marked influence on the composition of jugular blood.

Technical Research.—Defects in commercial milk products, such as the heat coagulation of evaporated milk and the microbial contamination of evaporated milk and canned cream, are being investigated.

Diseases of Dairy Cattle.—A final survey is being undertaken of the herds taking part in an experimental scheme for the eradication of tuberculosis prosecuted between 1929 and 1932. The results to date indicate that freedom from infection has not only been maintained in those herds which were clear at the end of the period, but that still further progress has been made in eradicating the disease from the experimental area and from the surrounding district. Measures for controlling contagious abortion and mastitis are being applied to a number of typical infected herds.—S. J. Edwards.

India, Madras. (1934). **Annual Administration Report of the Madras Civil Veterinary Department for the year 1933-34.** [Saunders, P. T.] pp. iii + 55. 4 figs. on 2 plates. Madras: Supt. Govt. Press. [8vo] [10 annas].

The department comprises the Madras Veterinary College and the organiza-

tions for the control of disease throughout the Presidency, for the investigation of problems relating to disease and for the manufacture of serum.

MADRAS VETERINARY COLLEGE.

The Principal and Professor of Medicine [HURLEY, T. J.] is assisted by one other professor and six lecturers. The curriculum is spread over three years and 117 students were in attendance. The University of Madras has resolved to institute a degree in veterinary science and the necessary regulations are being prepared.

COLLEGE LABORATORY.—Routine work entailed the examination of a very large number of pathological and parasitological specimens. It may be noted that *Babesia motasi* was identified in blood smears from sheep and *Plasmodium bubalis* in a blood smear from a buffalo.

TREATMENT AND CONTROL OF DISEASE.

There are 113 hospitals and dispensaries in the Presidency and 97 veterinary assistant surgeons are employed in these hospitals, 97 on itinerant duties and 51 on various other duties including 11 attached to the college.

The general health of the cattle of the Presidency during the year under report was satisfactory. There was a fall in the incidence of rinderpest, but an increase in the number of deaths from haemorrhagic septicaemia. No cases of glanders were reported. " Naganol " was used effectively in the treatment of trypanosomiasis and nasal granuloma was treated successfully with intravenous injection of antimony tartrate.

INVESTIGATION OF DISEASE.

This is carried out partly by the Veterinary Investigation Officer working under a scheme devised and financed by the Imperial Council of Agricultural Research and partly by the Staff of the Madras Veterinary College.

Research work included studies in regard to the pathogenicity of blackleg in the Presidency, the nature of the virus of pseudo-fowl plague [Newcastle disease], classification of a strain of tuberculosis of the elephant, paraplegia in horses, trypanosomiasis, nasal schistosomiasis in cattle and schistosomiasis in pigs.

With regard to paraplegia in horses, worms of *Setaria* species were discovered within the meninges of the brain and spinal cord reviving the question of helminthic infestation being the possible cause of the disease. An account of the life-history of the schistosome which causes nasal granuloma in cattle is an important feature of the report. Interesting experiments are recorded in connexion with the pathogenicity of trypanosomes in cattle and a special report on this is to be published.

SERUM INSTITUTE.

The work continued to be very effective and some interesting serological experiments and rinderpest virus investigations are recorded. Spirochaetes resembling *Treponema recurrentis* were detected in the blood of 16 animals used for serum preparation.

FINANCE.

The expenditure of the department was Rs.9,104,868. Receipts amounted to Rs.45,930.—G. K. WALKER.

BASUTOLAND. (1934). **Annual Report of the Principal Veterinary and Agricultural Officer for 1933.** [VERNEY, F. A.] pp. 24. 9 tables. [fcp] [Typescript].

The Chief Veterinary Officer took over the duty of Chief Agricultural Officer during the year, so this report contains more information than previous ones on

livestock farming and items of general agricultural interest. These subjects are not dealt with in this abstract.

An important feature of the year was a record drought.

ANIMAL DISEASES.

ANTHRAX was much less prevalent than usual, only 11 outbreaks being observed – the lowest on record. Some 58,000 cattle were inoculated against it.

EQUINE MANGE was dealt with by ordering Dipping Supervisors to inspect the horses in the course of their travels on duties connected with sheep. 1,556 affected horses were treated by hand dressing.

SHEEP SCAB.—Eleven outbreaks occurred in an area west of the Orange river; otherwise the disease was well under control. 50,667 sheep and goats were dipped. It is expected that sheep scab will be eradicated from Basutoland within a few years.

GOAT SCAB.—Six outbreaks occurred and were controlled by hand dressing.

EQUINE HEPATIC CIRRHOSIS [SENECIO POISONING] took a severe toll of horses kept in the mountains, the plant being able to survive drought.

SHEEP KEDS have become more numerous since the general dipping operations were suspended. An arrangement for dipping at a cost of a halfpenny per head was made.

AFRICAN HORSE-SICKNESS appeared suddenly both in the low and high lands in March and April and killed a large number of horses.

PARASITISM IN SHEEP AND GOATS continues to cause severe losses in spite of extensive propaganda by the veterinary department and the low charge made for anthelmintic medicine. The Basuto flock owners refuse to help in the matter.

MISCELLANEOUS.—" Strangles was very prevalent during the latter part of the year and at times assumed a serious type of infection."

Canine and equine piroplasmosis have been less prevalent than usual and this is attributed to the adverse influence of the drought on tick life.

ANIMAL HUSBANDRY.

Recovery in wool prices and the reduction in the livestock population owing to losses from the drought have been very advantageous economically, and overstocking, which reached its height in 1931, is now much less intense. The sheep, goat and horse census figures for 1931, 1932 and 1933 illustrate this point :–

	1931	1932	1933
Sheep	2,828,700	1,949,322	1,884,597
Goats	1,005,822	723,447	669,195
Horses	—	89,583	75,356

Cattle suffered much more from drought than sheep and goats, and it is estimated that about 119,400 head were lost (the last cattle census was 574,415 in 1921).

The veterinary department continued its effort to weed out poor quality rams and bulls, and to improve the native breeds without importing foreign sires. More progress has so far been made with sheep than with cattle.

Soil erosion in Basutoland is discussed, and recommendations for checking it are made. A proposal for the more systematic education of the Basuto farmers is outlined.—J. E.

NYASALAND PROTECTORATE. (1935). **Report of the Veterinary Department for the year ended 31st December, 1934.** [DE MEZA, J.] pp. 8. 2 tables. Zomba, Nyasaland : Govt. Printer. [fcp] [1s.]

STAFF.—Mr. D. O. TURNBULL retired in October and was succeeded by Mr. J. de Meza. In addition there were two British veterinary officers and two British stock inspectors : 255 African natives were also in the employ of the department. An attempt is being made to educate a number of natives to undertake skilled routine work, so that the European staff will be released for special investigations.

ANIMAL DISEASES.—3,620 cattle were treated for trypanosomiasis during the year by a small number of native assistants. The losses that occur are restricted to the Nyasaland-Portuguese East Africa border. The incidence of East Coast fever has been reduced in recent years by a policy of dipping. There were 60 government tanks and 50 private tanks in use, and over three and a half million cattle were dipped during the year. A few cases of anaplasmosis and piroplasmosis were diagnosed. Heartwater was diagnosed for the first time in Nyasaland by the finding of rickettsia in the tissues of the circulatory system. It is stated that *Amblyomma variegatum* is the vector.

Ephemeral fever [three days' sickness] and specific ophthalmia of cattle were common. Rabies was also present.

ANIMAL CENSUS	Cattle	Sheep	Goats	Pigs	Equines
European-owned	19,000	1,800	480	1,340	208
Native-owned	181,600	75,500	258,000	68,000	—

—J. E.

FIJI. (1934). **Annual Report, Veterinary Division, 1933.** [TURBET, C. R.]—*Annu. Bull. Dep. Agric. Fiji. 1933*. pp. 27-36. 5 tables, 3 appendixes.

The report is divided into parts dealing with Administration, Diseases of Animals and Animal Husbandry. None of the more serious acute epizootic diseases of animals occur. Tuberculosis is the most important disease to be controlled. The method adopted is inspection of all stock and the slaughter of manifest cases. The double intradermal tuberculin test is applied to certain dairy herds. A total of 1,356 animals was tested, and the reactors were found to be 11·43 per cent. as against 12·3 per cent. in 1932. In Suva dairy herds, 3·4 per cent. reactors were found as against 9·35 per cent. in 1932. *Brucella abortus* infection is causing more concern. Stephanuriasis of pigs is a serious disease. Fowl pox causes a heavy mortality, particularly in chickens from two weeks to two months old.

A census of stock showed that there were 69,981 cattle, 14,369 horses, 20,483 goats, 595 sheep and 1,752 domestic pigs in the colony.

The Stock Improvement Ordinance has worked well and has reached the peak of its usefulness with the animals available. There is now no complaint of unlicensed scrub bulls or stallions.

Cattle are kept for dairying and the breeding of beef cattle and draught stock. More horses are being used in agriculture than ever before. Owing to lack of market the local breeding of pigs can only be increased with profit up to the point where local requirements are satisfied.—C. R. TURBET.

UNITED STATES OF AMERICA. (1934). **Report of the Division of Veterinary Science, Michigan State College of Agriculture and Applied Science, East Lansing, 1934.** [GILTNER, W.] pp. 34. 17 tables. [8vo].

A brief general report is given on the activities of the Veterinary School, and is followed by reports of the various departments.

EXPERIMENT STATION REPORTS.

SECTION OF ANIMAL PATHOLOGY [HALLMAN, L. T.]—C. F. CLARK continued his work on diseases of the reproductive organs in cattle. Abortion, sterility, prenatal infection and the foetal membranes were the subjects dealt with. L. B. SHOLL has done some work on the blood cytology and chemistry of normal and diseased sheep.

SECTION OF BACTERIOLOGY [GILTNER, W.]—E. D. DEVEREAUX outlines the work carried out in dairy bacteriology. Good results have apparently been obtained by C. S. BRYAN with the use of lacto-vaccine as a cure and preventative for mastitis. No details are given. The thybromol reaction measures the abnormal pH of milk but does not accurately indicate the quarters or cows that are infected. Brilliant green 1 : 10,000 will adequately preserve milk under examination for mastitis and brucella infection. A mastitis-free herd was built up by making a bacteriological test of the milk from cows prior to and after purchase. A list of publications is appended.

W. L. CHANDLER reports on chlorine as a disinfectant against avian caecal coccidiosis. It is necessary to wear protective clothing when applying it. Colloidal iodine is said to be successful in controlling blackhead in turkeys, and is considered the most efficient anthelmintic for poultry.

H. J. STAFSETH reports on a visit to Mexico to study poultry diseases. Successful vaccine treatment for roup is mentioned. Lead poisoning, blackhead, coccidiosis, *Salmonella pullorum* infection and tuberculosis were under investigation. An extensive list of poultry specimens examined is given.

I. F. HUDDLESON has continued his work on brucella infection. A non-virulent culture vaccine for immunization of cattle against abortion is under investigation in co-operation with Dr. D. B. MEYER of the U.S. Bureau of Animal Industry. Tables are given to show the results which have been obtained by the vaccination of 44 herds. The most significant results are recorded in table III showing the difference in the infection rate between vaccinated animals and negative controls. The amount of brucella infection was considerably reduced by vaccination. The vaccine is apparently innocuous and does not establish itself in the bodies of the inoculated animals. Its immunizing value against undulant fever in man is under investigation.

Brucellin is now being issued for the treatment of undulant fever in man, and an attempt is being made to isolate its active principle. One of the fractions of brucella cells is being experimented with in the treatment of bovine infection, and investigations are being carried out on the biological activity of certain constituents isolated from brucella cells. Brucella immunity, susceptibility and infection in cattle are under investigation. A table is given showing the types of brucella isolated from human beings in various parts of the United States of America.—F. H. MANLEY.

ALGERIA. (1934). Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1933. [**Report of the Pasteur Institute of Algeria for 1933**]. [SERGENT, Ed.]—*Arch. Inst. Pasteur Algér.* **12.** 259-291. 1 table. [53 refs.]

This report is a résumé of the work of the institute on human and animal

diseases, the details of which have already been published in individual papers, a list being given [those of veterinary interest are dealt with separately in this *Bull.*]

RESEARCH.

Work of interest reported upon is as follows :–

BOVINE PIROPLASMOSIS and ANAPLASMOSIS [*Babesia bigemina* INFECTION].—Four valuable drugs are now known ; they are, in order of merit :– trypan blue, piro blue, " gonacrine " and " ichthargan ". " Ichthargan " and " gonacrine " are of value in the treatment of *B. berbera* infection, but no drug has so far been found for the cure of theileriasis or anaplasmosis.

For preventive immunization against piroplasmosis, the method in use for the last ten years has proved its worth [see this *Bull.* **3.** 131]. Attempts to immunize cattle against infection by *Anaplasma marginale* with *A. centrale* have been unsuccessful.

A harmless theileriasis of sheep (*Th. recondita*) was diagnosed in France (Pyrenees).

SHEEP POX.—Reference is made to the success attained with the sensitized vaccine of BRIDRÉ and BOQUET. The strength of immunity can be determined by means of an allergic skin test.

RABIES.—The decree of 1929 on the vaccination of dogs against rabies is criticized and is said to be ineffective. It is here stated that bitten dogs can be suitably treated by vaccination and that they therefore need not usually be killed.

ROUTINE WORK.

A description is given of the organization and work carried out, the results being given largely in tables.—J. E.

—. (1935). **National Association for the Prevention of Tuberculosis. Transactions of the Twenty-first Annual Conference, Southport June 27th, 28th and 29th, 1935.**—pp. xviii + 178. 1 chart, 3 photographs. London : Adlard & Son, Limited. [4to].

At the annual conference of the Association, the delegates discussed the methods of preventing tuberculosis in children and some 16 individual papers on various aspects of the problem were read and discussed. Four of them were of veterinary interest, in that they dealt with the bovine type of infection contracted from tuberculous milk. Dr. R. VEITCH CLARK, Major A. B. MATTINSON, Prof. CHRISTIANSEN, and Dr. NATHAN RAW all contributed to this theme.—J. E.

BOOK REVIEWS.

SCHÜRMANN, E. (1935). Die wichtigsten Geflügelkrankheiten. [**Diseases of Fowls**]. pp. 64. 42 figs. Berlin : Fritz Pfenningstorff. [2nd Edit.] [8vo] [RM.1].

The second edition of this work is a considerable improvement on the first which was reviewed in this *Bull.* **3.** 395. The book is larger, partly as a result of the use of larger type which makes reading less tiring, but also due to the addition of certain subjects. These include descriptions of infectious laryngotracheitis, fowl paralysis, stomach worm of geese, non-specific pneumonia, and diseases of the egg-laying apparatus. For the rest the author has retained the principles on which he based the first edition and the resulting book constitutes a useful guide to poultry breeders.—E. J. PULLINGER.

MENTZ, A. (1935). Veterinaerplanter, Laerebog I. Systematisk botanik for veterinaerstuderende. **[Plants of Veterinary Interest].** pp. 128. 94 figs. Copenhagen : Gyldendalske Boghandel. [8vo] [Kr. 4.50].

This is a new book on systematic botany, specially written for students at the Royal Veterinary and Agricultural College at Copenhagen ; it deals with medicinal, poisonous and fodder plants.

After a chapter on the structure of plants, the material is set out according to class, order, etc., throughout. The purely botanical aspect alone is described and no information on plant poisoning or pharmacology *per se* is given [though reference is made to the reason for the interest of each plant for veterinarians].

The numerous and excellent line drawings are a very valuable adjunct to the text, and there is a good index. This useful book will undoubtedly be well received.

—J. E.

ROEDER, O. [Geheimer Medizinalrat, em. o. Professor der Veterinärchirurgie und der Operationslehre an der Universität Leipzig], & BERGE, E. [o. Professor der Veterinärchirurgie und der Operationslehre, Direktor der Chirurgischen Tierklinik an der Universität Leipzig]. (1935). Chirurgische Operationstechnik für Tierärzte und Studierende. **[Surgical Technique for Veterinary Surgeons and Students].** pp. vii + 210. 124 figs. Berlin : Paul Parey. [3rd Edit.] [8vo] [RM.7.50].

This is a new and enlarged edition of the senior author's text-book of which the first edition appeared in 1903. It is a standard, concise text-book on surgical technique for veterinary students, incorporating the latest advances such as recent improvements in anaesthesia. It also includes a copy of the Animal Protection Law of Germany, which was passed in November, 1933, and which caused a revival of attention to inhalation anaesthesia in that country.

The book follows the usual lines and has sections devoted to restraint, methods of casting, preparation for operations, anaesthesia, suturing, standard operations on the head, neck, chest, abdomen, tail and limbs.

The figures, some borrowed from well-known standard text-books and some apparently new, are a noteworthy feature of the book. They are well reproduced in all cases.—J. E.